MARCH, 1913. Vol. LVII. No. 421.

JOURNAL

OF THE

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Registered for Transmission to Canada by Canadian Magazine Post.

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL

All communications (except those for perusal by the Editor only) to be addressed to the Secretary, Royal United Service Institution.

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WHITEHALL, S.W.

Telegraphic Address: "RUSSATUS, PARL, LONDON."

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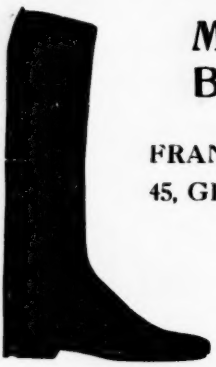

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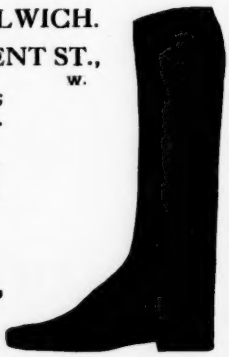

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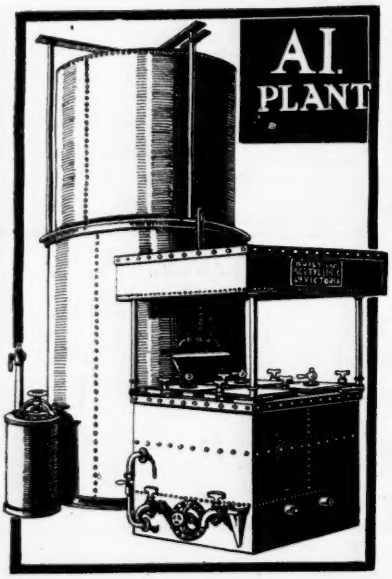

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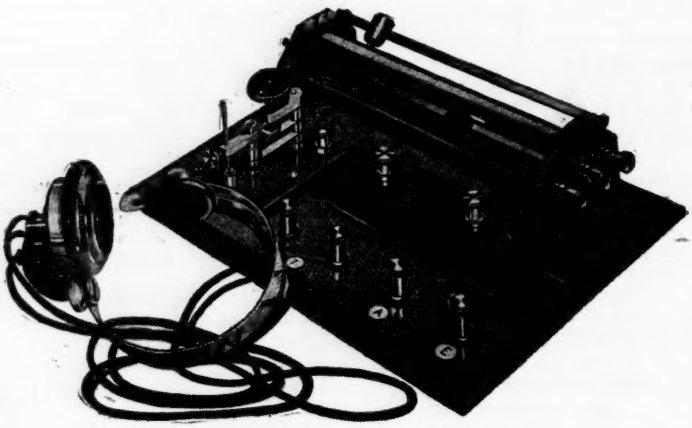

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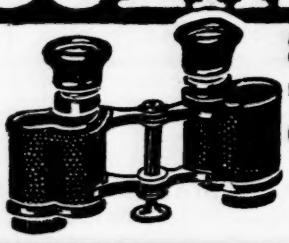

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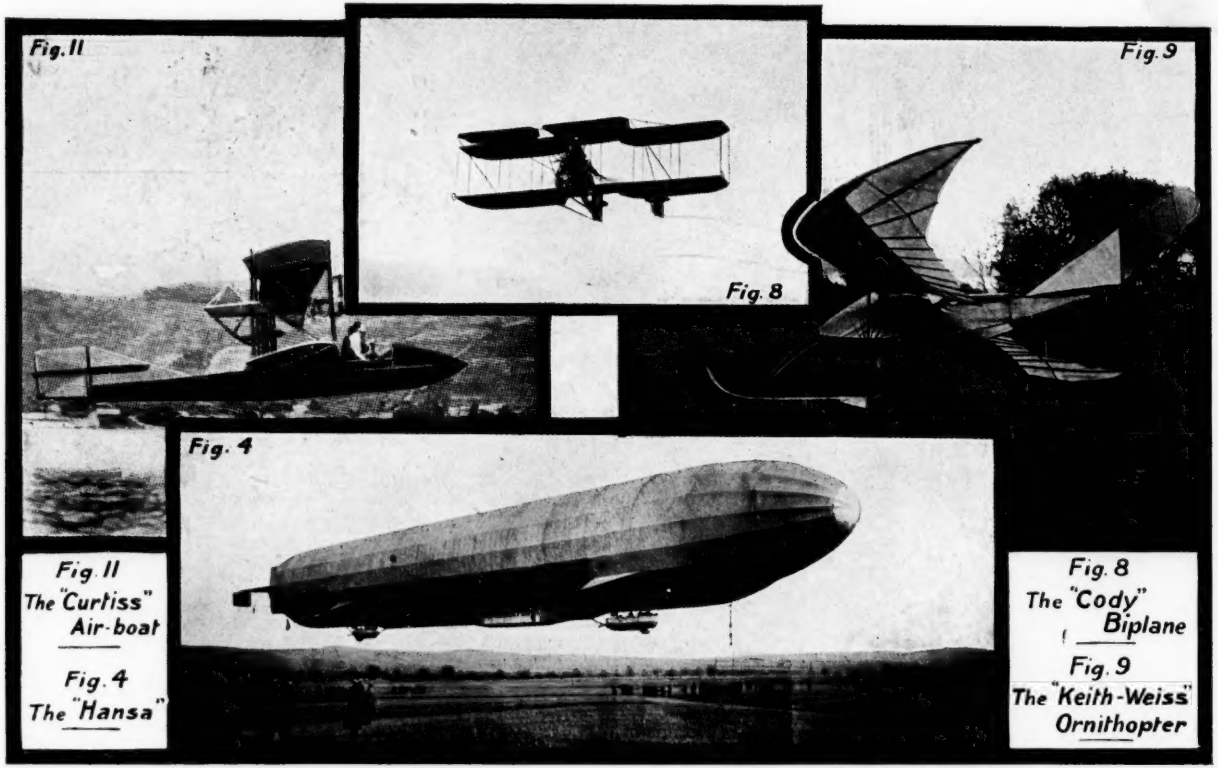

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TYPES OF AIRCRAFT (see page 305).

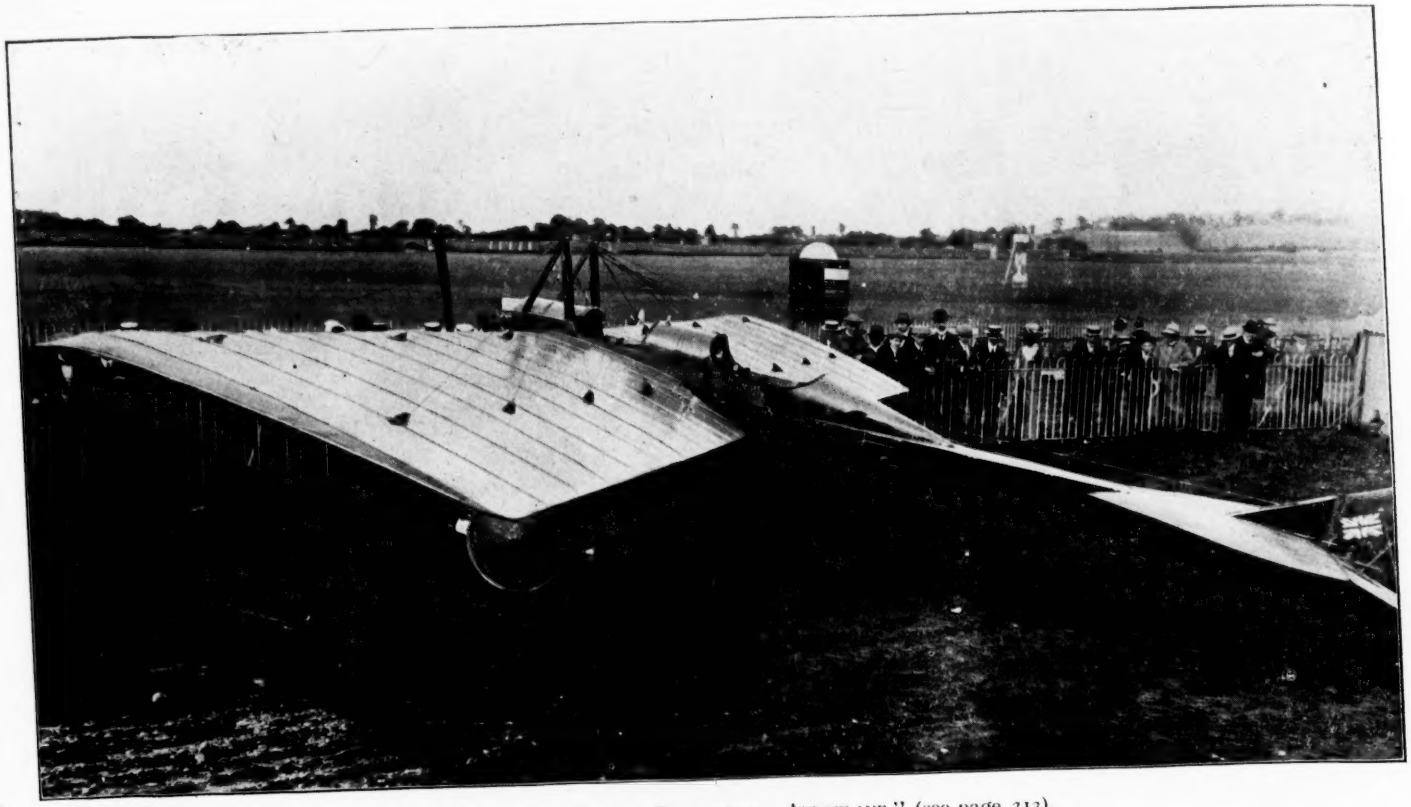

Fig. 7.—The "British Deperdussin Aeroplane" (see page 313).

ROYAL UNITED SERVICE INSTITUTION.

MARCH, 1913.

SECRETARY'S NOTES.

I.—COUNCIL.

At the Anniversary Meeting on Tuesday, March 4th, the following officers were appointed to the vacancies on the Council :—

Lieut.-General J. H. Bor, C.B., C.M.G., Royal Marine Artillery.
Major-General Sir Thomas Fraser, K.C.B., C.M.G., late Royal Engineers.

II.—NEW MEMBERS.

The following officers joined the Institution during the month of February :—

Captain S. Jones, Royal Welsh Fusiliers.
Second-Lieutenant Sir G. W. Ogilvy, Bart., Scots Guards.
Colonel F. J. Pink, C.B., C.M.G., D.S.O.
Colonel J. E. Goodwyn, late East Lancashire Regiment.
Colonel W. B. G. Cleather, late North Lancashire Regiment.
Lieutenant E. Le G. Whitting, R.A.
Lieut.-Colonel F. S. Terry, late King's Own Scottish Borderers.
Captain P. B. Jones, Middlesex Regiment.
Captain T. Frewen, 6th Bn. Royal Fusiliers.
Captain A. G. B. Bourne, M.V.O., Royal Marine Artillery.

In the February list :—

Lieutenant W. M. Burt-Marshall, Argyll and Sutherland Highlanders, should have been thus described.

III.—GOLD MEDAL ESSAY, 1912.

The Council have awarded the Gold Medal of the Institution, together with the first Trench-Gascoigne prize of 30 guineas for the Naval Essay of 1912, to Commander K. G. B. Dewar, R.N.

The second Trench-Gascoigne prize of 20 guineas to Commander E. V. F. R. Dugmore, R.N.

The Essays of Lieutenant S. D. Spicer, R.N,, and Captain B. M. Chambers, R.N., are recommended for publication.

The following officers kindly undertook the duty of referees, and to whom the thanks of the Institution were duly recorded at the Annual Meeting :—

Rear-Admiral F. C. D. Sturdee, C.V.O., C.M.G.
Rear-Admiral W. L. Grant, C.B.
Rear-Admiral R. G. O. Tupper, C.V.O.

The subject of the Essay was as follows :—

"What is the War Value of Oversea Commerce? How did it affect our Naval Policy in the past, and how does it in the present day?" Twelve Essays were submitted.

IV.—EXTRA LECTURE.

A lecture will be delivered by Mr. Frank Fox, late Royal Australian Field Artillery, war correspondent of the *Morning Post*, on "Observations of a War Correspondent with the Bulgarian Army," on Wednesday, March 26th, at 3 p.m.

V.—IMPORTANT "NEW STANDING ORDER."

The Council has recently passed the following standing order: "A Member in arrear with his annual subscription after March 31st, of each year, shall not be entitled to use the Institution buildings, receive the JOURNAL, or participate in any of the privileges accorded to Members."

VI. REGIMENTAL COLOURS.

The Institution is prepared to arrange at the Institution for the repairs to Regimental Colours and Cavalry Standards, in service or otherwise, and in future there will be no more delay than necessary in executing the work, the staff having been augmented; a very large number have been received during the past year. Enquiries having been made as to the cost of such repairs, the Secretary begs to state that the average cost is about £4 a colour, of which the Institution only receives 10s., to cover the cost of materials, carriage, etc.

VII.—ADDITIONS TO THE MUSEUM.

(6545). A Coloured Chart of the Flags of the various Maritime Nations, by Covens and Montier, King William III. period, entitled "A new table of all the Ships Collors or Ensings in the wholl Water World."

(6546). Model of H.M.S. "Rhadamanthus." The paddle-wheel transport "Rhadamanthus," four guns, was built at Plymouth, by Mr. T. Roberts, and completed in 1832. She was of the following dimensions:—Length of gun deck, 164 feet 7 inches; length of keel, 143 feet 2 inches; beam, 32 feet 8 inches; and depth in hold, 17 feet 10 inches.

She was 813 tons measurement; her engines, of 220 horse-power, were constructed by Messrs. Maudsley & Co.; and she carried a complement of 60 officers and men.

The "Rhadamanthus" assisted in blockading the Dutch ports in 1832, as one of the squadron under the command of Vice-Admiral Sir Pulteney Malcolm, G.C.M.G., K.C.B.—Given by Miss Roberts.

(6547). Miniature Portrait of Major Thomas Hamilton, 8th Dragoons, executed about 1750. He formerly served in Colonel Lowther's Regiment of Marines, and was one of the crew of H.M.S. "Wager" (Captain David Cheape) when she was cast away in the South Seas in 1741, the crew eventually reached Santiago in Chili. He returned to England in 1746, and was appointed a Captain in the 8th Dragoons, he became a Major in 1760, retired 1762, and died in 1773. The miniature was formerly the property of J. S. Hamilton-Starke, Esq., of Troqueer Holm, N.B.—Bequeathed by Major-General William Starke, late 15th East Yorkshire Regiment.

(6548). An Aquatint entitled "A View of the Horse Guards from Whitehall," published in 1816 by R. Ackermann.—Given by Percy Morris, Esq.

(6549). An Engraving of the Banqueting House, Whitehall, published in 1815 by Whittle & Laurie.—Given by Percy Morris, Esq.

(6550). A Coloured Print entitled "Mounting Guard," dedicated to the Little Masters on the Parade. It is a caricature, and dated about 1750.

(6551). Four Coloured Prints of "Military Incidents," by Ackermann, dated about 1830, entitled:—

(1) On duty, the Field Officer of the day.
(2) Just joined the Regiment.
(3) The Baggage Guard in a fall of sleet.
(4) The Dinner Round, Light Company 19th Foot.—Given by Percy Morris, Esq.

VIII.—MUSEUM PURCHASE FUND.

This fund has been opened with the object of purchasing suitable exhibits which are from time to time offered to the Museum, and which are put up for sale at various auctions. The Council hope that it will receive support from members of the Institution who are interested in the Museum.

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A Pocket History of the Royal Dublin Fusiliers. By Sergeant-Major C. V. Brumby. Second Edition. 18mo. (Presented by the Author). (Gale & Polden, Ltd.). Aldershot, 1912.

Entrenchments—when, where, and how they should be made: from an Engineer point of view. By Lieut.-Colonel J. A. Gibbon, R.E. (Aldershot Military Society). (Hugh Rees, Ltd.). London, 1913.

A Colony in the Making, or Sport and Profit in British East Africa. By Lord Cranworth. 8vo. 12s. Illustrated. (Macmillan & Co., Ltd.). London, 1912.

Wellington and Waterloo. By Major G. W. Redway. 12mo. 6d. (Presented by the Publishers). (T. C. & E. C. Jack). London, 1912.

Kent. (Cambridge County Geographies). By C. F. Bosworth. Crown 8vo. 1s. 6d. (University Press). Cambridge, 1909.

Sussex. (Cambridge County Geographies). By C. F. Bosworth. Crown 8vo. 1s. 6d. (University Press). Cambridge, 1909.

Les devoirs des Maires en cas de mobilisation générale. By Paul Distère, Second Edition. 8vo. 2s. (Paul Dupont). Paris, 1913.

With the Conquered Turk. By Lionel James. Crown 8vo. 2s. Illustrated. (Thomas Nelson & Sons). London, 1913.

With the Victorious Bulgarians. By Lieutenant Harmenegild Wagner. 8vo. 7s. 6d. Illustrated. (Constable & Co., Ltd.). London, 1913.

With the Turks in Thrace. By E. Ashmead-Bartlett. 8vo. 10s. Illustrated. (William Heinemann). London, 1913.

Die Schlacht bei Ljaojan vom 30 August bis 3 September, 1904. By Lieut.-Colonel August Zell, Austro-Hungarian Army. 8vo. 4s. (Presented by the Publishers). (L. W. Seidel & Sohn). Vienna, 1912.

The Gallant Way (Poems). By Frank Taylor. 8vo. 2s. 6d. (Presented by the Author). (John Murray). London, 1913.

Le Rôle du X^e Corps au 16 Août, 1870. By General Palat (Pierre Lehautcourt). 8vo. (Presented by the Author). (Libraire Chapelot). Paris, 1913.

Der Kampf um Sperrbefestigungen im Landkriege. By Captain W. Stavenhagen. 8vo. 1s. 6d. (Presented by the Publishers). (E. S. Mittler & Sohn). Berlin, 1913.

Tactical Essays for Certificate "A" Candidates Officers' Training Corps. By Captain T. Bedford Franklin. 12mo. 3s. (Presented by the Publishers). (Gale & Polden, Ltd.). London, 1913.

Prisoners of War, 1861-65—A Record of Personal Experiences, and a Study of the Condition and Treatment of Prisoners on both sides during the War of the Rebellion. By Thomas Sturgis, late First Lieutenant 57th Regiment Mass. Vet. Vols. 8vo. Illustrated. (Presented by Captain Chas Slack). (G. P. Putnam's Sons). New York, 1912.

Outposts of Empire. By John Lang. Illustrated by J. R. Skelton. 8vo. 6s. (T. C. & E. C. Jack). London, n.d.

Staff Duties and other Subjects. By Brig.-General G. G. Aston. Crown 8vo. 3s. 6d. (Presented by the Publishers). (Hugh Rees, Ltd.). London, 1913.

The Infantry Scout, an Outline of his Training. By Captain F. S. Montague-Bates. Crown 8vo. 1s. 6d. (Presented by the Publishers). (Hugh Rees, Ltd.). London, 1913.

Lectures on Musketry Training. By Quartermaster-Sergeant-Instructor J. E. Price. 12mo. 2s. 6d. (Presented by the Publishers). (Forster, Groom & Co., Ltd.). London, 1913.

The Sailor whom England feared—being the story of Paul Jones. By M. MacDermot Crawford. 8vo. 15s. Illustrated. (Eveleigh Nash). London, 1913.

Memories of the Sea. By Admiral Penrose Fitzgerald. 8vo. 12s. 6d. Illustrated. (Edward Arnold). London, 1913.

The Fate of Empires. By A. J. Hubbard. 8vo. 6s. 6d. (Longmans, Green & Co.). London, 1913.

The Making of Modern England. By Gilbert Slater. 8vo. 7s. 6d. (Constable & Co., Ltd.). London, 1913.

Siberia. By M. P. Price. 8vo. 7s. 6d. Illustrated. (Methuen & Co., Ltd.). London, 1912.

The Navy and Sea Power. By David Hannay. 12mo. 1s. (Williams & Norgate). London, 1913.

The Modern Warship. By E. L. Attwood. 12mo. 1s. (University Press). Cambridge, 1913.

L'Indo-Chine Française. By L. Faque. 12mo. 8d. (Felix Allan). Paris, 1910.

Medals and Campaigns of the 43rd Foot, now 1st Battalion of the Oxfordshire and Buckinghamshire Light Infantry. By Major W. J. Freer. 8vo. Illustrated. (Presented by the Author). (Harrison & Sons). London, 1912.

THE JOURNAL

OF THE

ROYAL UNITED SERVICE INSTITUTION.

VOL. LVII. MARCH, 1913. No. 421.

[Authors alone are responsible for the contents of their respective Papers.]

"TOLL FOR THE BRAVE."

"Had we lived, I should have had a tale to tell of the hardihood, endurance and courage of my companions, which would have stirred the heart of every Englishman."

Captain Robert Falcon Scott, C.V.O., R.N., the leader of the National Antarctic Expedition of 1911, whose tragic fate has thrilled with sympathy all Britain, was born at Outlands, Devonport, on June 6th, 1868. For generations his forebears had served their country either in the Navy or Army. In continuance of the family tradition, he was sent at 11 years of age to Mr. Foster's school, Stubbington House, Fareham, from which he passed into H.M.S. "Britannia" in 1880. While here he was elected one of the eight captains of his term. In 1883 he passed out with 11 months' seniority. He never served as a cadet, for on leaving the "Britannia" he was appointed to H.M.S. "Boadicea" on the Cape of Good Hope station, and had to go out and join her there as a midshipman.

Returning to England in 1886, he was appointed to H.M.S. "Monarch," and in the following year was sent to H.M.S. "Rover" for a short time. The examinations for sub-lieutenant then followed, in which he took four first-class certificates and a second. In 1888 he was appointed sub-lieutenant to H.M.S. "Spider," in 1889 to H.M.S. "Daphne," and then to H.M.S. "Amphion," commanded by Captain Hulton, for service on the Pacific station, with headquarters at Esquimalt. After three delightful years on the Pacific Coast he returned to England and specialized in torpedo work. This led to his appointment, first in 1892 to H.M.S. "Curlew," and then to H.M.S. "Vernon." While here he had charge of Torpedo-boat 87. In 1893 he joined H.M.S. "Vulcan," under Captain Bacon, remaining with this ship until 1895. He applied for a

home billet in 1895, and was appointed to H.M.S. "Defiance," at Devonport, a torpedo school ship, from which he joined H.M.S. "Majestic" in 1896—the flagship of Admiral Sir Harry Stephenson in command of the Channel Squadron. The following year (1897) he became first-lieutenant. The "Majestic" was then commanded by Captain Prince Louis of Battenberg. These years may be called the turning point of Captain Scott's life. Prince Louis was succeeded by Captain, now Admiral Sir George Egerton, and it was largely through his influence that Captain Scott fell under the spell of Polar work and exploration.

During a short visit to London, he, by chance, met Sir Clements Markham, President of the Royal Geographical Society, who was at the time planning to equip and send out an expedition to the Antarctic to try to penetrate the hitherto unknown continent behind the great unexplored ice barrier. Sir Clements Markham had so far materialized his plans at this time, that he had, with generous aid from private persons, the Admiralty and the Royal Geographical Society, started his scheme. The "Discovery" was being built especially for the purpose of ice work, and the scientific staff was appointed. Sir Clements having been intimately connected with the Royal Navy was anxious to have the ship under a naval commander, and had obtained a promise from the Admiralty that one should be lent for the expedition. Meeting by chance Lieutenant Scott, as he then was, he told him of his proposed plans, and suggested that he should send in his name to apply for the post of commander. At first Captain Scott hesitated to take a step that must for a time sever his active connection with the Navy, but eventually applied and was appointed. The glamour of Polar exploration now seized his imagination with a strong grip, and became the master object of his life. He set himself down in 1899 for a year's hard toil, going personally into every minute detail of equipment, commissariat and scientific preparation required for exploration and research during three years sojourn in a land separated by the stormiest ocean in the world from all sources of supply. His capacity for organization and leadership was now clearly shown. During this time he was in intimate contact with the scientists of all nations, who willingly placed at the disposal of the expedition all their knowledge bearing on the subject. He was elected in 1900 a Fellow of the Royal Geographical Society, and was also promoted to commander. This time of preparation, which seemed all too short to the anxious leader, came to an end when he took his ship round to Spithead for the swinging of compasses. On July 28th, 1901, the "Discovery" slowly made her way out of the East India Dock amid the enthusiastic good wishes of a crowd of onlookers. Captain Scott had put his whole heart and soul into his work, and he and his followers were united in feeling that success would follow if it were humanly possible.

At Cowes, King Edward and Queen Alexandra honoured Captain Scott and his gallant crew with a visit of farewell, during which Captain Scott was given the M.V.O. The spirit of adventure had seized all who sailed with him, and was largely added to by his own enthusiasm, which, however, was tempered with a deep feeling of responsibility for all. The ship's crew were mainly bluejackets who had served before with Captain Scott or knew his reputation as an officer. These few he had carefully selected from among hundreds of volunteers from the Royal Navy. Among the ten officers and scientists who messed in the wardroom with Captain Scott were Lieutenant A. Armitage, R.N.R., Dr. R. Koettlitz, Mr. T. Hodgson (biologist), Lieutenant C. Royds, R.N., Lieutenant M. Barne, R.N., Dr. E. Wilson, R. Skelton, R.N., Mr. H. Ferrar (geologist), L. Bernachi (physicist), and Lieutenant E. Shackleton, R.N.R. The "Discovery" left Cowes on August 5th, 1901, and reached Lyttleton, New Zealand, on November 29th. Here the final preparations were made, and on December 21st she started for the Antarctic. Three weeks later Captain Scott sighted for the first time the great ice barrier that he had come out to conquer. He sailed along it looking for winter quarters, and finally took up his position at the western end of the barrier by Ross Island, looking up to the mountains and glaciers of South Victoria Land. Here, in March, 1902, the "Discovery" was frozen in for two years. Captain Scott now applied himself to all the many schemes for the welfare of his following and the advancement of the scientific work, in all departments of which Captain Scott personally interested himself. A hut was erected near the ship so that the ship's company could have enlarged accommodation for work and recreation. The value of the latter, Captain Scott, as leader, quite understood. The party being as comfortably housed as conditions permitted, Captain Scott then set to work to prepare for the great object of the expedition, the exploration of the wind-swept land behind the ice barrier. The long winter months from March to September, 1902, were spent in preparation, and directly the sun rose in October, Captain Scott got ready to start. On November 2nd, he, Dr. Wilson and Lieutenant Shackleton, with sledges drawn by a team of 19 dogs, were off on the Southern journey, which resulted in their reaching latitude 82°17 South, a point 300 miles nearer the Pole than that reached by any of his predecessors. Captain Scott returned most regretfully, but not disheartened, and with the deep-rooted determination to conquer those ice slopes yet.

The journey was most trying, all the dogs died, and the party had to drag their sledges back. Lieutenant Shackleton broke a blood vessel and almost died, but was brought safely back to the ship.

In the following year Captain Scott carried out an equally extended journey into the interior of South Vic-

toria Land, penetrating far to the west over the lofty plateau region. His companions this time were Petty Officer Evans and Lashley. This was an even more adventuresome journey than the Southern one. Blizzards raged, and the weather conditions were very bad. In spite of this, he and his companions reached 146° 33 East, and established a depôt 2,000 feet up the glacier before they turned back. During the return journey they had a series of misadventures. Many things were lost, including their compass, owing to a sledge upsetting in a blizzard. Then rushing down a hill, their sledge was brought up with a sudden shock on the edge of a crevasse, Captain Scott and Evans, who were harnessed to it, were thrown down the crevasse, hanging only by their harness to the sledge. This Lashley wedged, and hung on to one end to keep her straight and steady. Scott eventually managed, by swinging, to get himself out, and helped Lashley to save their companion from his terrible position.

On February 9th, 1904, the "Discovery" left McMurdo Bay and started on her homeward journey. She reached Lyttleton on April 1st, 1904, and Portsmouth on September 9th. Here, Captain Scott had a warm reception from the Navy, and was the recipient of a message from King Edward, in which His Majesty congratulated him, his officers and men on the success of the Expedition. Here, he also received on September 10th his promotion to Captain, and a C.V.O. was conferred on him a month later when Captain Scott had the honour of visiting His Majesty at Balmoral.

The Royal Geographical Society presented him with the Founder's Gold Medal, and gold medals were conferred on him by Italy, the United States, Norway, Sweden, Belgium and Denmark, while France conferred on him the Bouton Rouge of the Legion of Honour, and, among others, the Hungarian, Austrian and German Geographical Societies sent him certificates of merit, and elected him an honorary member of their Societies in recognition of his great services to science and exploration.

From October, 1904, Captain Scott had to undertake new, and, in a way, more arduous work, in giving a course of lectures on the results of the expedition all over Britain, and in writing a book on the voyage. In "The Voyage of the Discovery" he displayed a fine and unexpected literary capacity for simple but forceful writing, largely reminiscent of the Elizabethan age.

Upon the publication of his book in 1905, Captain Scott returned to the Navy, and was appointed to the Admiralty for especial work on the decision of trade routes in peace and war time. On the termination of this work, he took a short War Course, and was in 1907 given command of H.M.S. "Bulwark," the flagship of Admiral Sir George Egerton, the Headquarters of which were at Chatham.

The year 1908 found Captain Scott back again at the Admiralty as assistant to the Second Sea Lord, Sir Francis Bridgeman. He had begun to materialize his plans for a second attack on the Polar regions. Money had to be raised, and the task of collecting funds was a very arduous one, and very distasteful to Captain Scott. £40,000 was required to equip an Expedition, and it was only when the Treasury came forward with a promise of half that amount that any progress was able to be made. Captain Scott had an idea, which was very general among the "Discovery" staff, that much labour and sacrifice of dog life could be saved if some form of motor were used for haulage. Between 1908-9 he was much occupied in working out with well-known firms, a form of motor sledge, which he tried in the spring of 1908, at Lauteret, in the Alps. During this trial period he joined Dr. Charcot, the great French Polar explorer, who was working on the same scheme. Together they tested the working powers of their sledges, and Captain Scott adopted the French design. The spring of 1909 found him in Norway, testing improved motor sledges, with satisfactory results. In 1909 plans were sufficiently advanced to permit the selection of those to go with him. The estimation in which Captain Scott was held as a leader is shown by the fact that during the fortnight after he had announced his future plans for another expedition, he received over four thousand applications, several officers signed on for 1s. a month, and every member of the crew would willingly have served for nothing at all.

The story of the Expedition, from the information at present available, is now pretty generally known, and need not be repeated here at length. Briefly, the "Terra Nova" sailed from Port Chalmers, New Zealand, on November 28th, 1910, with 58 officers and men, 35 dogs, 19 ponies and two motor sledges, arriving at McMurdo Sound on January 22nd, 1911. The Expedition established their winter quarters at Cape Evans, 14 miles north of the Discovery Station. The advance to the South Pole was not commenced until October 25th, a month later than was originally intended, with the intention of saving the ponies from extreme cold. It has been suggested that to this late start were due the extra difficulties and bad weather which beset the British Expedition both on the outward and homeward journeys to the Pole. By December 21st the party had reached Lat. 85.7 S., Long. 163.4 E., 6,800 feet above the sea and four miles from Mt. Darwin; on Christmas Day, 1911, they reached Lat. 86 S., on New Year's Day 86.56 S., and on January 3rd, 87.32 S., height 9.800 feet. From this point Comander Evans and two men returned with the last despatches, and Captain Scott, with Captain Oates, Dr. Wilson, Lieutenant Bowers and Petty Officer Evans went forward with one month's provisions. They reached the Pole on January 17th-18th. Captain Scott's figure for its exact position differs by only half a mile or so from that of Amundsen.

Captain Scott accomplished his work. He reached his goal only to find another country's flag flying there. The little party of five turned back to encounter appalling weather conditions. There was nothing when the last letters were written from 175 miles off the Pole to shadow the terrible calamity which has since been unfolded. Subsequent events conspired to overwhelm all well-laid, carefully thought-out plans.

The return journey began on January 18th, and a series of good marches averaging about 18 miles per day were accomplished until crossing the Beardmore glacier, when they found deep snow surfaces which greatly impeded them; moreover, Petty Officer Evans was becoming weak, and falling, injured his head. He was helped along, but on February 17th he again fell, and then had to be taken on a sledge, but died two hours afterwards.

The distance between the depôts was about 65 miles, which allowed a speed of nine miles per day on full rations, with stages of seven—eight days, but on some days during the return, owing to the failing health of Captain Oates, the speed of the party fell to three miles. Whilst in camp during a blizzard on March 15th, Captain Oates, who had suffered greatly and had become quite unable to travel, went to sleep hoping not to awake again; he knew that the only chance of safety for his comrades was to go on and leave him, but that they would not do so while he was alive. But on the 16th he awoke and said that he wished to go outside for a little and might not be back for some time; he went out into the blizzard and was never seen again. "It was the act," writes Captain Scott in his diary, "of a brave man and an English gentleman." The remaining three struggled on again till March 21st when they had to camp once more in a blizzard only 11 miles from One Ton Camp, where provisions and fuel were waiting them in plenty. The party had covered 1,842 miles on their journey to the Pole and back.

Captain Scott, true to his position as leader to the very last moment, saw all his companions die under these incredible hardships, and then calmly, heroically wrote his last message to the public, which is given here verbatim:—

MESSAGE TO THE PUBLIC.

The causes of this disaster are not due to faulty organization, but to misfortune in all risks which had to be undertaken.

1. The loss of pony transport in March, 1911, obliged me to start later than I had intended and obliged the limits of stuff transported to be narrowed.

2. The weather throughout the outward journey, and especially the long gale in 83° South, stopped us.

3. The soft snow in the lower reaches of the Glacier again reduced the pace.

We fought these untoward events with a will and conquered, but it ate into our provisions reserve. Every detail of our food supplies, clothing, and depôts made on the interior ice sheet, and on that long stretch of 700 miles to the Pole and back, worked out to perfection. The advanced party would have returned to the Glacier in fine form and with a surplus of food but for the astonishing failure of the man whom we had least expected to fail. Seaman Edgar Evans was thought the strong man of the party, and the Beardmore Glacier is not difficult in fine weather. But on our return we did not get a single completely fine day. This, with a sick companion, enormously increased our anxieties. I have said elsewhere we got into frightfully rough ice, and Edgar Evans received concussion of the brain. He died a natural death, but left us a shaken party, with the season unduly advanced.

But all the facts above enumerated were as nothing to the surprise which awaited us on the Barrier. I maintain that our arrangements for returning were quite adequate, and that no one in the world would have expected the temperature and surface which we encountered at this time of the year. On the summit in Lat. 85° to Lat. 86° we had *minus* 20 to *minus* 30.

On the Barrier in Lat. 82°, 10,000 feet lower, we had *minus* 30 in the day and *minus* 47 at night pretty regularly, with a continuous head wind during our day marches. It is clear that these circumstances came on very suddenly, and our wreck is certainly due to this sudden advent of severe weather, which does not seem to have any satisfactory cause.

I do not think human beings ever came through such a month as we have come through, and we should have got through in spite of the weather but for the sickening of a second companion, Captain Oates, and a shortage of fuel in our depôts for which I cannot account, and, finally, but for the storm which has fallen on us within 11 miles of this depôt at which we hoped to secure the final supplies.

Surely misfortune could scarcely have exceeded this last blow. We arrived within 11 miles of our old One Ton Camp with fuel for one hot meal and food for two days. For four days we have been unable to leave the tent, a gale blowing about us. We are weak, writing is difficult; but for my own sake I do not regret this journey, which has shown that Englishmen can endure hardship, help one another, and meet death with as great a fortitude as ever in the past. We took risks—we know we took them. Things have come out against us, and therefore we have no cause for complaint, but bow to the will of Providence, determined still to do our best to the last.

But if we have been willing to give our lives to this enterprise, which is for the honour of our country, I appeal to our countrymen to see that those who depend on us are properly cared for.

Had we lived I should have had a tale to tell of the hardihood, endurance, and courage of my companions which would have stirred the heart of every Englishman.

These rough notes and our dead bodies must tell the tale, but surely, surely a great rich country like ours will see that those who are dependent upon us are properly provided for.

(Signed) R. SCOTT, 25th March, 1912

In this message one sees the character of the man. No "might have beens." "I do not regret this journey," "We took risks, we know we took them"; then again, "things have come out against us, and therefore we have no cause for complaint."

He was able, though as he says "We are weak; writing is difficult," to do all honour and credit to his heroic followers. He covered them in their sleeping bags and laid himself down, too weak after this last effort to get wholly into his own bag, with his head against his diary.

In 1908 Captain Scott married Miss Kathleen Bruce, youngest daughter of Canon Lloyd Bruce, who had already made herself a reputation as a sculptor. They have one child—a boy, Peter, born September, 1909, whom his father saw for the last time when he was barely a year old.

He was a strict officer, respected but liked by his men, who acknowledged his intellectual power as well as his great physical strength, and responded to his demands as a leader with wholehearted devotion.

Captain Scott's name with those of his heroic companions will go down to posterity written in letters of imperishable fame.

The relief parties which were sent out from the base to assist the Southern Party in February, 1912, were forced to turn back owing to sickness, want of food for the dogs, and the extraordinary severity of the weather. It was not till October 30th, 1912, that a seach party was able to set out.

One Ton Camp was found to be in order and all provisioned. Then proceeding along the old Southern route, Mr. Wright's party, on November 12, sighted Captain Scott's tent.

Within it were found the bodies of Captain R. F. Scott, Dr. E. A. Wilson, and Lieutenant H. R. Bowers.

After the bodies had been identified, the inner tent was placed over them, and a large cairn of snow was erected. A cross was placed on the top of the cairn and the following record was left:—

This cross and cairn erected over the remains of:

CAPTAIN R. F. SCOTT, C.V.O., R.N.,
DR. E. A. WILSON, *and*
LIEUT. H. R. BOWERS, R.I.M.,

as a slight token to perpetuate their gallant and successful attempt to reach the Pole.

This they did on the 17th January, 1912, after the Norwegians had already done so on the 14th December, 1911.

Also to commemorate their two gallant comrades, CAPTAIN L. E. G. OATES, *of the Inniskilling Dragoons, who walked to his death in a blizzard willingly, about 20 miles south of this place, to try and save his comrades beset by hardship; also* PETTY OFFICER EDGAR EVANS, *who died at the foot of the Beardmore Glacier.*

"The Lord gave and the Lord taketh away. Blessed be the Name of the Lord."

This record was signed by all the members of the search party.

All the records were collected, and the whole search party proceeded 23 miles to the south to look for the body of Captain Oates, but no trace of it was found. Near the site of his departure from his comrades a cross and cairn were erected, and the following record was left on the cairn:—

Hereabouts died a very gallant gentleman,
CAPTAIN L. E. G. OATES, *Inniskilling Dragoons,*

who, on their return from the Pole in March, 1912, willingly walked to his death in a blizzard to try and save his comrades beset by hardship.

Captain L. E. G. Oates.

Captain Lawrence Edward Grace Oates, of the Inniskilling Dragoons, who died on March 17th, 1912 (his 32nd birthday), on the return journey of the Southern Party of Captain Scott's Expedition from the South Pole, came from a family already known as explorers, his father and uncle both having

NOTE.—Captain Scott's message and the story of the discovery of the bodies are from telegrams to the Central News, and are reprinted by permission of the *Strand Magazine*.

travelled far afield in East Africa. He was educated at Eton, but left early in consequence of a severe attack of pneumonia. He was gazetted to the Inniskilling Dragoons on May 30th, 1900, and in 1901 went out to join the regiment in South Africa. In March of that year he was severely wounded in an engagement near Aberdeen, Cape Colony, and for the conspicuous gallantry he displayed in the action, he was mentioned in despatches (see below).

He never entirely recovered from the effect of his wound, one leg always remaining shorter than the other, a fact which would have deterred most men from embarking upon such a difficult and arduous enterprise as the Antarctic Expedition.

After the war, he served successively with the regiment in Ireland, Egypt and India; he took over the Adjutancy on August 1st, 1906, and was promoted on November 19th that year. As a regimental officer he was remarkable for his personal popularity, his practical ability and his power of ruling men.

Oates was a lover of all forms of sport. He was a daring and capable yachtsman, and had a passion for the sea. He trained and raced his own horses when in Ireland, and succeeded in winning the Grand Military at Punchestown, as well as other races. When the regiment arrived in India from Egypt, he re-started the Mhow Hounds, and hunted them with great success until he left India.

He was also a keen polo player and pig-sticker, and an enthusiastic *shikari*, but in spite of the many attractions of India he readily abandoned them all to go out with the Antarctic Expedition, and sailed from England in the Terra Nova at the end of May, 1910. Although he had no previous experience in the line of exploration, the fact that he had the honour of being chosen to accompany the Southern Party came as no surprise to those who knew his endurance and determination, and no truer comrade could have been selected, or a more cheerful companion under any hardships.

His loss will be deeply deplored by all those who knew him, especially by all ranks of the regiment to which he belonged.

To quote the words used by Major-General Allenby when speaking in the Theatre of the Royal United Service Institution at the close of a lecture on Cavalry, on the 12th of last month:

> "He was full of resource and high courage, and his death will go down to history as one of the most heroic deeds ever known. Realizing that he was a burden on his companions he deliberately walked out of the tent and sacrificed his life for his comrades. That is the type of officer we get in the cavalry, and as long as we get them we shall do well."

Captain Oates in South Africa.

With regard to the incident in the South African War referred to in the above notice, the following particulars are supplied to us by an officer who was present with Sir C. Parsons' column on the occasion :—

Speaking recently at the R.U.S. Institution, General Allenby recalled a feat of Captain Oates, who lost his life with Captain Scott under such appealing circumstances. Oates, when a lad, of a few months' service, distinguished himself very greatly in charge of a patrol of young soldiers who had just arrived from England, being himself wounded. As he was not with his regiment, there are perhaps few who will remember the incident, but it is worth telling, as a fitting gambit in a life which has ended in so striking an example of self-sacrifice and courage in its highest form.

Early in 1901, Kritzinger and Scheepers, and one or two more subordinate commandants left behind in Cape Colony after the first great De Wet hunt, were loose among the mountains of the Schwartzberg, between Prince Albert and Willowmore. They had gradually been forced towards Aberdeen and Graaf Reinet. Colonel Sir Charles Parsons' column, formed of odd troops hastily scraped together, had been following them and was moving by rail from Willowmore to Graaf Reinet. This force consisted of some Royal and Australian Artillery, the Sharpshooter I.Y., and some 60 boys just arrived from England *en route* to join the 6th Inniskilling Dragoons. With them, a cheery lad just commissioned, was Oates.

Arriving at Aberdeen Road by rail, the first train load pushed on at once to Aberdeen, then threatened by Scheepers. With this first party were the dragoon recruits. After a "scrap" that night the advanced party bivouacked, till joined by Sir C. Parsons and the remainder of the force. Next morning three patrols of about 20 men were sent out to look for the commando. They soon found them. The patrols were of that dangerous strength, which is too small to do any effective fighting, but is too strong to escape observation. One patrol was driven in, helter skelter, on the outposts and the column guns; another was captured. The third, on the far right, consisted of Oates and his 20 recruit boys.

For some time nothing was heard of them. Then away in the veldt, across the shimmery thorn and mimosa scrub, came the tic-toc of rifle fire, distant yet distinct. Away somewhere, someone was scrapping very busily; later, by ones and twos, dragoon recruits came back on foot, rifle in hand and bandoliers empty.

It transpired that Oates had been surrounded, had dismounted to fight in a donga, and that his horses had been shot. Refusing all summons to surrender, he had fought it out. As a bandolier became empty, he ordered away on foot, creeping down the donga, the man and rifle when no longer useful.

Finally, when the last cartridge was expended, the Boers crept in on their prize. It consisted of some dead horses, a dead boy or two, and Oates and half a dozen more wounded. There was no ammunition, hardly any rifles as prize, and nothing but saddles. The Boer commandant, a hard-bitten nut, said what he thought—disgust at the smallness of his capture, amazement and admiration at the grit of the children—they were little more. Their comrades of the column arrived too late to do more than bury the dead and remove the wounded.

Such was the *baptême de feu,* in the year of grace 1901, of that Edward Lawrence Oates, who eleven years later has died in an act of duty and self-sacrifice that has stirred the whole civilized world.

A communication issued by the Admiralty on receipt of the news of the disaster ends with the following passage:—

"The circumstances in which Captain Scott and his comrades lost their lives prove the constancy and resolution with which they carried out the duty for which they volunteered. Their Lordships consider that their loss should be regarded as if they had been killed in action, and their story will long be remembered with honour by the Navy."

The Chairman and Council, on behalf of the Members of this Institution and themselves, desire to express their deep sympathy with the relatives of those gallant officers and men who have so nobly added to the roll of fame of their countrymen. They would also like to offer their admiration and congratulations to *all* who took part in this expedition—for in dwelling upon the noble examples which ended in death whilst on Duty we must not forget to honour those who, with Commander Evans, have survived, and who, in the various exploring parties and in the relief expedition have shown us again how to overcome great difficulties and to face great dangers, privations and hardships cheerily.

THE SOUTHERN CROSS

AERONAUTICAL PROGRESS.

By COLONEL J. D. FULLERTON, Royal Engineers (retired).

On Wednesday, 19th February, 1913, at 3 p.m.
MAJOR-GENERAL RUCK, C.B., Royal Engineers., in the Chair.

Introductory Remarks. I.—Scientific Research. II.—Airships. III.—Aeroplanes. IV.—Hydroplanes. V.—Fuel and Motors. VI.—Propellers. VII.—Stability. VIII.—The Flight of Birds. IX.—Meteorology. X.—Wireless Telegraphy. XI.—Photography. XII.—Strength of Aircraft. XIII.—Uses of Aircraft. Concluding Remarks. Appendix I.—References. Appendix II.—Additional Notes. (Figures 1, 2, 3, 10, 12, 13, 14, 15, 16, 17 in the text, and 4, 7, 8, 9, 11 in frontispiece).

The Chairman: To those who know the history of aeronautics in England, Colonel Fullerton needs no introduction. I think it is upwards of 20 years ago since he delivered his first lecture on this subject at this Institution. I sometimes think that we do not sufficiently appreciate the efforts of the early pioneers of aviation; and therefore it is the more satisfactory when an officer like Colonel Fullerton comes forward, who has studied the subject for so many years, and gives us his views and opinions, which deserve the greatest consideration.

INTRODUCTORY REMARKS.

THE LECTURER: General Ruck, ladies and gentlemen,

In 1892 and 1906 I had the honour of giving lectures before this Institution, explaining some of the general principles of "Aeronautics," and describing the chief machines then attracting notice. I propose now to give a brief review of the present state of affairs, and to discuss further probable lines of development. As before, I shall divide the subject into sections, as this is, on the whole, the most convenient manner of dealing with it.

SECTION I. SCIENTIFIC RESEARCH.

The work to be done under this heading consists of (I) Mathematical Investigations, (II) Experimental work with small scale bodies, etc., (III) Experimental work with, and tests on full-sized machines.

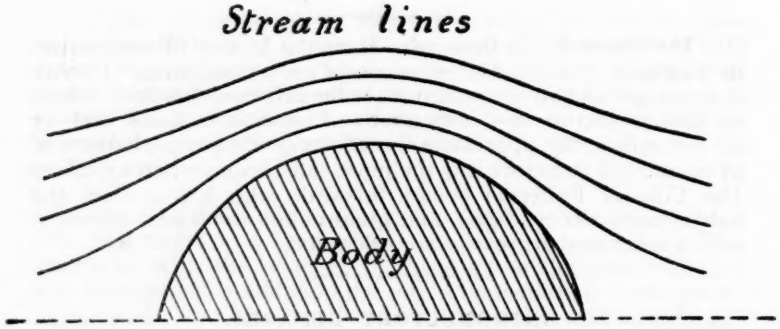
1. Mathematical Investigations.

A great many problems in aeronautics can be investigated in this way. The principal ones now attracting attention are briefly described below; see also Sections VI. and VII.

A. MOTION OF BODIES IN A FLUID (PERFECT).

In order to simplify this question, the fluid is first assumed to be perfect, that is to say, frictionless, incompressible (*viz.*, the forces acting upon it do not affect its density), and continuous. As a consequence, the body, whatever its form, encounters no total resistance, because any pressure (due to the motion) on its head, is counter-balanced by a corresponding pressure on its tail. (See *Report of British Association,* 1875, Froude). The first person to show how such bodies could be designed was Rankine, who, in his "Source and Sink" system (see *The Engineer,* 1868, and the usual text books), discussed the whole subject, and his theory forms the basis of modern

Fig. I.



ideas regarding this question. A typical example of one of these "fair-shaped" forms is shown in Fig. 1. By using Bernouilli's theory for velocity and pressure, the forces acting all round the body can be found, and it is clear that the resultant pressure=0. Taylor (see *Proc. Inst. Nav. Architects,* Vol. 35) improved upon this theory, and showed how to design more ship-shaped forms, and it seems possible by suitably arranging the sources and sinks, to extend his theory to any form likely to be required, provided always that they are "fair-shaped."

B. MOTION OF THIN SURFACES (PERFECT FLUID).

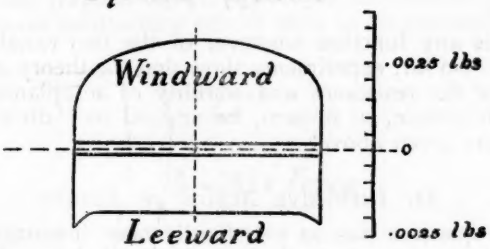
In this case, Rankine's theory cannot be easily applied, because such surfaces are not "fair-shaped." The theory now used is that of Helmholtz, which has been much improved by Kirchhoff, Lord Rayleigh, Sir G. Greenhill, and others. In this system, the surface is treated as if it stood in a jet of fluid, and it is assumed that the boundaries of the figure formed in rear of it are free surfaces having the same current velocity as that of the main stream (see *Dynamics of Mechanical Flight,*

Greenhill). The pressure formula given by this method is $p = .0011\ V^2$ per sq. ft., where V equals velocity. This is a good deal lower than the best experimental results, *viz.*, $p = .0017\ V^2$, the reason being that the air does not flow in the way assumed. An inspection of Fig. 2, which represents

Fig. 2.

Pressures on Central Section

Square Plane



the pressures at different points on a square plane (see *Nat. Physical Laboratory Researches*, Vol. I.), shows this at once. as also the fact that the thickness of the surface has great influence on the type of flow.

C. THE LAWS OF COMPARISON.

The object of these laws is to lay down rules, which will enable the resistance of a full-sized machine to be foretold from the resistance of its model.

Froude's Law.—The late Mr. Froude showed that if a full-sized machine was λ times the linear dimensions of its model, then the resistances, etc., are in the proportions given below :— (See *The Power and Speed of Ships*, D. W. Taylor).

TABLE I.

Weight, force or resistance	λ^3	Power	$\lambda^{3.5}$
Surface	λ^2	Pressure per sq. unit	λ
Moment of inertia	λ^5		

provided that the resistance varied as V^2, and that the velocity of the large machine was $\sqrt{\lambda}$ times that of the model. This is a most important law, as experiment shows that it is very accurate in the case of aeroplanes and propellers (see *La Résistance de l'Air*, by Eiffel, and *Reports of Adv. Com. for Aeronautics*, 1912). The reason why it does not apply to

balloon shapes is that the skin friction does not follow the V^2 law.

New Law.—This is based on suggestions made by Lord Rayleigh, and is at present being investigated by the Adv. Com. for Aeronautics. The general idea is that both form and frictional resistance depend upon certain factors, *viz.*, the linear dimensions (l), velocity (v), viscosity of the fluid (ν), density of the fluid (ρ), and gravity (g), and that consequently the resistance must be of the form :—

$$R = \rho l^2 V^2 f\left(\frac{\nu}{Vl} \cdot \frac{lg}{V^2}\right)$$

where f is any function whatever of the two variables in the brackets. So far, experiments show that the theory is generally correct for the resistance and stability of aeroplanes and propellers; it cannot, at present, be applied to "dirigibles" for the reasons given above.

D. Impulsive Action of Fluids.

This question has, as yet, hardly been investigated at all, though it was brought to light by Lilienthal (see *Bird Flight as the Basis of Aviation*) many years ago. He showed, by means of a wing-flapping model, that the pressure under the wings was far greater than that given by the usual formula, even when the model had no forward motion. This surprising result appears to be due to the fact that, at each reversal of the wing, extra power is required to start the air in motion (owing to its inertia), just as in starting any other body; and, consequently, the average value of the pressure is greatly increased, especially when the reversals occur at short intervals. Further investigation as to the nature of impulsive action is much required.

2. Experimental Work.

A great deal of work of this kind has been done during the past few years, especially by M. Eiffel, who has freely published the results obtained at his experimental laboratory, and shown how model data can be used for finding the resistances, etc., of full-sized machines (see *La Résistance de l'Air,* Eiffel).

A. General Object.

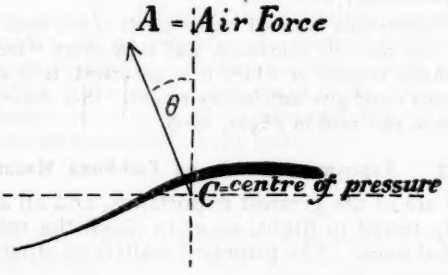
The general object of this class of experiment is to find the pressure, line of action, and point of application, of the air forces acting on a body, see Fig. 3. The question is a very difficult one, as such forces really consist of two parts, *viz.*, "form resistance" and "skin friction," and there does not, at present, seem to be any very satisfactory way of separating them. The usual plan is to find the total resistance experimentally, to assume some "skin friction" law, such as Zahm's

and to take the form resistance as equal to the difference between the two. It cannot be said that the results are satisfactory, but the total resistance is accurate enough, within the limits laid down for the Laws of Comparison.

B. TESTING APPARATUS.

The principal apparatus used are "Whirling Tables," "Air Tunnels," and "Water Channels." In all of these the bodies to be tested are driven through air, or water (or kept stationary, the air moving against them), and the pressure, etc., at given velocities, measured by suitable recording apparatus (see Eiffel and *Reports of Adv. Com. for Aeronautics*). On the whole the most satisfactory results seem to be obtained from air

Fig. 3.



tunnels, but care must be taken to see that the current is, as nearly as possible, uniform all over the cross-section. The bodies tested must not be too large, otherwise the friction of the air against the sides of the tunnel will interfere with the results. Small channels are very useful for studying the flow of water round bodies, as photographs can be taken, showing the form of the stream lines.

C. RESULTS.

Only a few general results will be given here, as it is much better, in every case, to make actual experiments, especially if the bodies and surfaces to be tested are of an unusual form.

FLAT SQUARE PLATES, PERPENDICULAR TO CURRENT.—For these $p = KSV^2$, where S = area of the surface. With metric units, $K = .07$ to $.085$; British units $K = \frac{1}{800}$. The centre of pressure is at the centre of form.

FLAT SQUARE PLATES, INCLINED AT ANGLE α. Here $p = \eta KSV^2$ and $\eta = 2 \sin \alpha$ for small angles. The position of the centre of pressure is given by Joessel's formula $d = l(.2 + .3 \sin \alpha)$, where d = distance from front edge, l = width of the plane.

CURVED SURFACES.—These should always be tested experimentally, as the pressures, etc., vary very much with the shape. A good type should give a ratio of lift to drift of not less than 1 in 12 at 6°, and the position of the centre of pressure, *viz.*, the point where the lines of action of the lift and drift forces intersect, should not vary much for angles from about + 15° to − 15°.

BODIES: SUCH AS BALLOON FORMS, ETC.—These should always be tested experimentally, at different velocities, as no strict law for pressures, etc., is at present known. Good ordinary shapes, such as those tested by Adv. Committee, 1912, give:—

$$p = \frac{1}{9} KAV^2, \text{ when } V = 20 \text{ ft. per sec., } A = \text{area cross section.}$$

Some experiments at the Aircraft Factory seem to show that the coefficient of V = 1.98.

SKIN FRICTION.—The chief experiments on this subject are those of Froude (water) and Zahm (air). The models used were very thin boards of different lengths; the results obtained agree fairly well. For air (l = length), $f = .00,000,778\ l^{.93}\ V^{1.85}$.

Further information is much required. It is not clear that the "form resistance" was correctly calculated, and since every "fair shaped" form has some definite velocity at which it is generated, it is doubtful whether the experiments could give satisfactory results. (See *Atmospheric Friction*, by A. F. Zahm, reprinted in *Flight*, 1911).

3. Experimental Tests on Full-Sized Machines.

These are of the greatest importance, and all aircraft should be carefully tested in flight, so as to check the real results with the estimated ones. The principal matters to attend to are given below:—

WEIGHT OF MACHINE IN FLYING ORDER.—This includes weight empty, working load, *viz.*, crew, fuel for some fixed number of hours, instruments, etc., and useful load, *viz.*, passengers, etc. The whole should be accurately weighed, airships being taken to pieces when necessary.

CENTRE OF GRAVITY, FULLY LOADED.—This is done by resting one end of the machine on a scale, and attaching the other to a second scale hanging on an overhead beam. Three readings of the scales taken with the machine in different positions will give the centre of gravity. In the case of airships the centre of gravity is usually found by calculation, as soon as the weights of the parts are known.

RADIUS OF GYRATION.—To find this the machine is hung from an overhead girder, and swung like a pendulum. The position of the radius of gyration can then be found by the usual rules when the time of the swing is known.

STRENGTH OF SUPPORTING SURFACES.—This is sometimes done, but it is a severe test. The machine is turned on its back and the surfaces are loaded with bags of sand in such a way that the weights represent the possible stresses that they may have to withstand. The Breguet firm successfully tested one of their machines in this way, with a load = 5.2 times the flying weight.

THRUST OF PROPELLERS.—This is done in flight by a special recording instrument, which shows automatically the thrust at any given time. Various patterns of instruments are used, but the general principle is to measure the movements of a collar on the propeller shaft pressing against a spring. A pencil is fixed on the collar, and marks the thrust on a small cylinder rotated at a certain speed by a clockwork or other motor.

VELOCITY IN FLIGHT.—The most suitable arrangement appears to be to mount a kind of Pitot's tube on one wing of the aeroplane, or at some place on an airship where the air is flowing naturally. A suitable recording apparatus in the car shows the pressures of the fluid in the Pitot tube, and gives the velocity due to them.

RATE OF CLIMBING.—For this, a small and specially delicate aneroid is used. The marking pen makes dots at intervals of half-minutes, and the required rate can be found by measuring the intervals between the dots. (See *Military Aeroplane Competition Report.*)

GLIDING ANGLE.—An apparatus for this purpose was used at the 1912 Military Aeroplane Competition. It was a sort of combined velocity meter and aneroid, the indications of which were obtained photographically on a strip of bromide paper, by projecting the shadows of the gauges. The time dots were also marked by a clockwork-actuated pencil, and the whole path of the machine in the air was thus traced on the paper. The gliding angle at any instant could be found by measuring the fall in height and the distance traversed horizontally in any given time.

4. Remarks.

It will be seen from the above, that considerable progress has been made during the last three or four years. Much, however, remains to be done, and it is to be hoped that this important work will be considerably extended in the immediate future.

SECTION II. AIRSHIPS.

The chief characteristic of this type of aircraft is, the fact that the weight is supported by a bag or envelope, of suitable form, filled with a gas (hydrogen) lighter than air, and consequently no power is required for the support of the machine.

1. Classification.

The different types now in use are: (A) rigid: Zeppelin, Schütte-Lanz, etc.; (B) semi-rigid: Lebaudy, Gros, etc.; (C) non-rigid: Astra, Parseval, etc. No progress has been made recently with either "hot-air" or "mixed" types.

2. General Descriptions.

The various "dirigibles" differ very much in their construction, etc. A brief description as to principal features of each type is given below:—

(A.) RIGID TYPE.

[See Fig. 4, the "Hansa" (frontispiece).]

EXAMPLE.—Zeppelin. GENERAL DETAILS. Length=about 500 ft.; diameter=45 ft.; volume=700,000 cf.; useful load=five tons. Envelope: rigid, cloth-covered, metal framework, cylindrical in form, with pointed ends, 16 to 18 gas-holding balloons inside of it. *Cars*: one passenger, two crew, all rigidly attached to framework; chief command in front of car, with all controls. *Motors*: four to six of 150-H.P. each. *Propellers*: four to six with from two to four blades each. *Steering* (horizontal plane): vertical rudder in rear. *Steering* (vertical plane): box type elevating and depressing, horizontal rudders in rear. *Starting, etc.*: water ballast pumped out of or into car by fire brigade on ground. *Storehouses*: large iron sheds, or anchorages, at which airship rides like a boat on water. *Armament*: two M.-guns in car, one M.-gun on top of envelope. *Wireless telegraphy*: 300-mile radius. *Speed*: 45 to 50 miles per hour; ascending speed, 10 ft. per sec. (?) (See *Aeronautics*, *Flight* and the *Aero*.)

(B.) SEMI-RIGID TYPE.*

EXAMPLE.—"Gross IV." GENERAL DETAILS: length=94 m., diameter=12 m., volume=9,600 cm. *Cars*: two. *Suspension*: metal girder hung from envelope; cars hung from girder. *Motors*: two 100-H.P., one in each car. *Propellers*: one, four-bladed, in each car. *Speed*: 17 metres per sec. Fitted with wireless telegraphy. (See *Jahrbuch der Luftfahrt*, by A. Vorreiter.)

(C.) NON-RIGID TYPE.*

EXAMPLE.—"Adjudant Reau." GENERAL DETAILS: Length=86.78 m., diameter=16 m., volume=8.950 cm.* *Envelope*: rubber cloth, exterior a yellow tint, interior has a coating of vulcanized rubber; two ripping panels; two automatic valves, which can be worked by hand. *Ballonets*: two so arranged as to facilitate longitudinal equilibrium; each has an automatic valve, which can be worked by hand. *Car*: in a long girder, suspended by cables from an equatorial belt sewn into the envelope, l=45 m., section 2 m. by 1.66 m. *Stability*: box tail planes (52 sq. m.) in rear, mounted directly on the envelope. *Motors*: two 120-H.P. Brazier type. *Propellers*: three, one in front of car, 6 m. in diameter; the other two at the sides, 3.7 m. in diameter. *Steering in horizontal plane*: vertical biplane rudder. *Steering in vertical plane*: two biplanes, one in front and one in rear of car. *Starting from and Alighting on water*: by water anchor, and cylinder, which can be filled with water or emptied as desired. Speed, 53 kilom. p.h. (See *Aerophile*, 1912).

3. Performances.

The following are some of the performances of the different types:—

* Photographs of the "Gross IV." and "Adjudant Reau," which were used to illustrate the lecture have been omitted owing to want of space.—Ed.

RIGID.—"Hansa" travelled 800 kil. in 12 hours. "Victoria Louise" on one occasion reached a height of 2,000 metres. *Semi-rigids.*—No satisfactory details available. *Non-rigids.* The "Adjudant Reau" has done 989 kilom. in 21 hours, 20 minutes. The "Comte" on one occasion reached a height of 3,050 metres.

4. General Remarks.

The advantages and disadvantages of dirigibles may be summed up as follows:—

ADVANTAGES.—Can carry a large, useful weight; can stand still in the air; fairly heavy shells can be fired from them at objects on the earth; specially suited for night and meteorological work; can carry a really serviceable wireless equipment.

DISADVANTAGES.—Must be very large; form a large target; require large storehouses, and special equipment for starting and alighting; large amount of inflammable gas carried, a great objection; very expensive to build and maintain.

On the whole, I think it is very doubtful whether it is worth while building this type of aircraft. They will certainly be found useful for meteorological work, and, possibly, until larger aeroplanes are built, for war purposes, but the large target they form and the risk of explosion are such serious disadvantages that it does not seem desirable to undertake their manufacture on any considerable scale. Any "dirigibles" built should be of the "rigid" type, with, perhaps, lifting screws, and shock-absorbing car device, as arranged in Dr. Barton's new machine.

SECTION III. AEROPLANES, ETC.

The chief characteristic of this type of aircraft is the fact that the weight is directly supported by the air, and that consequently power is required for support as well as for propulsion.

1. Classification.

The different types may be classified as follows:—(A) monoplanes, biplanes, etc.; (B) helicopters, or direct lift machines; (C) ornithopters, or machines with flapping wings. The first class is by far the most numerous, the remainder have up till now met with little or no success.

2. Monoplanes, Biplanes, etc.

As there are a great many different types in this class, I will only briefly describe two typical ones, *viz.*, a monoplane and a biplane, both of which were very successful in the Military Aeroplane Competition, 1912.

A. BRITISH DEPERDUSSIN.

[*See Fig. 7 (frontispiece).*]

The British Deperdussin Co. has kindly furnished me with some details of this machine, and a photo (see Fig. 7, also *Flight* and *Aeronautics*).

GENERAL DESCRIPTION.— Monoplane, with rear elevator; weight, empty=1,226 lbs.; in flying order, with four-and-a-half hours' supplies, etc., 2,037 lbs.; useful load=350 lbs. *Supporting Surfaces*: cambered, main planes=236 sq. ft., aspect ratio 6.1, trailing edge near body cut out to give a view. *Body*: boat-shaped, pilot in rear seat, observer in front. *Tail*: cambered, area=39 sq. ft. *Motor*: 80-H.P. Gnome; petrol, 9.8 gallons per hour; oil=1.8 gallons per hour (see *Flight*, 7th September, 1912). *Tanks*: fuel under seats, oil over motor. *Propeller*=9 ft. in diameter. *Controls*: foot gear, working vertical rudder, area=5 sq. ft.; wheel column warping main planes (side to side motion), and working the elevator (backward and forward motion). *Carriage*: as shown in Fig. 7, with endless wire suspension; rear skid under tail acts as brake when landing. *Performances*: (see *Military Aeroplane Competition Report*, 1912). Speeds: fast, 68.2 m.p.h.; slow, 54.6 m.p.h.; gliding angle, 1 in 6.1; rate of climbing, 4.7 ft. per second; stopped on grass in 78 yards. Maximum height=3,150 ft., but could, no doubt, have reached 4,500 ft.

B. THE "CODY" BIPLANE.

Mr. Cody has kindly given me the photograph (Fig. 8, frontispiece).

GENERAL DESCRIPTION.—Biplane, with front elevator carrying weight, and small rear damping planes; weight, empty=1,948 lbs.; in flying order, with four-and-a-half hours' supplies, etc., 2,658 lbs.; useful load=350 lbs. *Supporting Surfaces*: cambered, with flattish top; main planes, 430 sq. ft.; front elevator, 60 sq. ft.; dampers, 10 sq. ft.; gap, 6½ ft.; aspect ratio, 7.8 to 1. *Body*: partially enclosed, pilot in front, passenger in rear. *Motor*: Austrian-Daimler, 110-H.P.; petrol, 9 gallons per hour; oil=.42 gallons per hour (see *Flight*, 7th September, 1912). *Propeller*: 11 ft. diameter, geared down. *Controls*: elevator in two parts, works in unison with warping of main planes to secure lateral balance; vertical rudders (2), area, 30 sq. ft., mounted on same plane as dampers; wheel column universally pivoted for warping and elevating; separate horizontal gear for vertical rudders. *Carriage*: as in Fig. 8; two small wheels in front, wheel track of large wheels (2), 3 ft. 6 ins.; small fender wheels under ends of lower supporting surfaces; rear skid immediately in rear of carriage. *Performances*: (see *Military Aeroplane Competition Report*, 1912.) Speeds: fast, 72.4 m.p.h.; slow, 48.5 m.p.h.; gliding angle, 1 in 6.2; rate of climbing, 4.75 ft. per second; stopped on grass in 56 yards. Maximum height=4,500 ft.

Note.—This machine is exceptionally strong, and has great variation of speed. (See *Aero*, *Aeronautics*, *Aeroplane*, and *Flight*).

C. NOTE ON REQUIREMENTS OF THIS TYPE.

A good type of machine of this class should carry a useful load of about 400 lbs. Total weight carried per H.P.=25 lbs.; speeds, fast, 80 m.p.h.; slow, under 60 m.p.h.; gliding angle, about 1 in 7; rate of climbing, 4½ ft. per second. As regards working, turning circles should not, as a rule, be less than 100 yards in radius (banking angle 20°), and ***no sudden***

changes of direction should be made, especially in the vertical plane (descents), as changes of this kind subject the machines to very severe strains. Flights in wind of over 45 miles an hour should be discouraged.

D. SPECIAL MACHINES.

There are two very interesting machines, *viz.*, the Weiss and the Dunne, in which "stability" is made a special feature. In both, the supporting surfaces are constructed on the principle of the wings of soaring birds, *viz.*, a negative angle of inclination at the tips, and, as pointed out by Pettigrew, a generally screw-like form. These machines appear to be quite exceptionally stable, and it is to be hoped that they will be further developed.

3. Helicopters.

In this class of machine the lift is obtained by using screws or turbines to drive a column of air downwards, and thus generate the necessary supporting force; while forward motion is provided for, by either using a propeller like those in ordinary aeroplanes, or by inclining the axis of the lifting screws, so that they both lift and propel. To prevent accidents in the case of the screws failing to act, supporting surfaces are provided which allow of the machine coming gently to the ground if necessary. So far as I am aware, the only helicopter now under construction is that designed by Mr. Davidson. It somewhat resembles a bird with three pairs of outstretched wings on each side, a large screw, 26 ft. 10 ins. in diameter, being fixed in the centre of each of these systems. The two screws are worked from a motor in the body, and both lift and propel on the second system described above.

As in all such cases, the lifting screws are of the ventilating fan type, the object being to produce a large lifting force. It should be noticed, that as a helicopter advances, it comes upon fresh air, just as an aeroplane does, and that this considerably improves the lifting capabilities of such machines. The chief difficulties to overcome are, the design of the screws, and the mechanism for ensuring their working in unison. It is to be hoped that further experiments will be made with helicopters, as it is a great advantage to have a machine which can hover, or stand still in the air. (See *The Helicopter*, by J. R. Porter, and Section VI.)

4. Ornithopters (Wing Type).

With the exception of Mr. Weiss' machine described below, no Ornithopters have, so far, I believe, been constructed on a large scale lately. Mr. Frost, the President of the Aeronautical Society, built one more than 30 years ago, but the want of a suitable engine prevented its completion. Some very interesting

models were made by the late Mr. F. W. Brearey (see *Proc. Aeronautical Soc.*, 1882), who used what he called a "pectoral cord," a kind of india rubber spring, and showed that when this cord was not in use, it was necessary for flight to wind the elastic motor up 40 times, while when it was used, only 13 windings were necessary. Major Moore, R.E., also constructed a model, full details of which are given in the *Journal of the Aeronautical Society*, October, 1897.

The general theory of these machines is not very well understood. The wing is, of course, merely a screw propeller with a reciprocating instead of a rotary action, but the exact part played by the springs, pectoral cord, etc., has not yet been very clearly defined.

A. THE KEITH-WEISS WING MACHINE.

(See Fig. 9, *Aero*, August and September, 1912).

Mr. Weiss has kindly given me some information and the photo (see Fig. 9, frontispiece).

GENERAL DESCRIPTION.—Bird type; weight, empty=90 lbs., with pilot, 230 lbs. *Supporting Surfaces*=80 sq. ft.; two hinges for each wing; rate of flapping, 20 beats per minute. *Motor*: none, the flapping being done by man-power. *Springs*: these assist the flapping (details confidential); when at rest they hold the wings outstretched, and this position cannot be altered until the machine is in the air. *Pedals*: to work wings, pressed down alternately. *Speed*: 30 m.p.h. estimated. N.B.—The machine is exceptionally strongly built, and has been frequently launched as a glider with great success. It cannot rise in still air, but a wind of 10 miles per hour would probably enable it to do so. (See also *The Aero*, 1912). In the latest design it is proposed to use compressed air instead of springs, the pressure of the air being normally such as to allow the weight just to hold the wings horizontal.

5. Remarks on Aeroplanes.

The advantages and disadvantages of aeroplanes may be summed up as follows:—

Advantages: high speed; no inflammable gas; small and difficult target in war; small cost; only small sheds required; fair chance of successful use as fighting machines.

Disadvantages: small size and small useful load carried; *difficulty of increasing size of present types, owing to starting and alighting question;* cannot stand still in the air; not very well adapted for wireless telegraphy; *poor stability;* not very suitable for night work.

6. Suggested Improvements.

The great defect in the present types of aeroplanes seems to be poor stability. They should be designed much more upon

the lines of birds, with flexible give-and-take supporting surfaces, as such a design greatly improves the balance. The addition of fins, etc., is unnecessary, as the work done by them should be done automatically by the flexible supporting surfaces.

SECTION IV. HYDROPLANES.

The chief characteristic of this type of aircraft is that they are fitted with a carriage or body so designed as to allow them to rise from or alight upon water.

1. Classification.

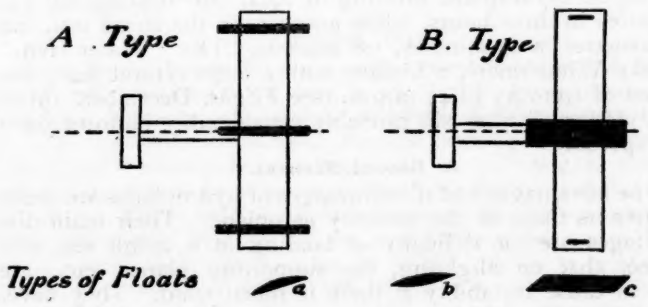
The different types are (*a*) ordinary aeroplanes arranged to rise from, or alight upon sea ships; (*b*) smooth water hydroplanes; (*c*) air-boats intended for use at sea. Type (*a*) need not be considered, as the inconvenience caused by this arrangement to the working of a battleship is so great, that the system is hardly a practicable one.

2. Smooth Water Hydroplanes.

These may be described as the ordinary type of aeroplane, with floats instead of the usual wheel and skid under-carriage. A few machines have both floats and wheels, so as to allow of

Fig. 10.

Hydroplane Floats



starting from water or land, as found necessary. The systems of floats used may be divided into two classes, *viz.*, the small and distributed floats, and the large central single floats. The distributed floats (see Fig. 10) are usually placed (two or three) under the main supporting planes, a small one being sometimes added under the tail. It was soon found, with the arrangement shown in Fig 10 A, that alighting was extremely difficult, as

the whole machine tended to spin round on the first float which touched the water, as an axis. The second system of one large float placed centrally, with small fender floats under the ends of the main planes, has proved much more satisfactory. Even with this system, however, alighting is troublesome if the water is at all rough, and it seems probable that machines of this type will only be used on smooth water, lakes, etc. Both these types have one great disadvantage, *viz.*, that they strike the water with considerable force; spring attachments are, of course, used, but even then a good deal of damage may be done to the floats if the water is at all rough.

3. The Air Boat.

This type includes hydroplanes like the "Donnet l'Evêque" and "Curtiss," both of which are practically sea boats fitted with aeroplane-supporting surfaces.

A. The Curtiss Airboat.

[*See Fig.* 11 (*frontispiece*).]

Messrs. Curtiss have kindly supplied me with some information and a photograph of their latest pattern airboat.

The machine is really a boat, 26 ft. long, to which has been fitted the ordinary Curtiss biplane type supporting surfaces. The total weight is 1,800 lbs., of which 800 lbs. is useful load. The controls are double; the motor can be started by the pilot. Speed=60 miles per hour.

4. Performances.

Very few definite details on this point are available. At the Belgian Hydroplane Meeting in 1912, one machine did 240 kilometres in three hours, while another, in the speed test, did 20 kilometres in 12 minutes, 1.8 seconds. The "Water Hen," on Lake Windermere, a biplane with a large central float, has a speed of from 33 to 45 m.p.h. (see *Flight*, December, 1912). The "Airboat" type will probably considerably improve upon these speeds.

5. General Remarks.

The advantages and disadvantages of hydroplanes are much the same as those of the ordinary aeroplane. Their main disadvantages are the difficulty of landing in a rough sea, and the fact that on alighting, the supporting planes, etc., are liable to cause instability if there is much wind. They have, however, one great advantage over aeroplanes, *viz.*, that they can be made larger and carry greater useful load, as they are not limited in space for starting. Improvements necessary are as for aeroplanes, *viz.*, flexible give-and-take supporting surfaces, and, further, suitable arrangements for folding up the surfaces when floating on the water. The airboats appear to be a very promising type of aircraft, and it is to be hoped that their construction will continue.

SECTION V. FUEL AND MOTORS.

The source of all power is the "fuel," the "motor" is merely a machine for utilizing the power of the fuel to the best advantage.

1. Fuel.

The chief fuels used are coal (14,000 B.T.U.), gas (19,200 B.T.U.), and petrol (20,000 B.T.U.), and the materials used for generating electricity. [N.B.—One British thermal unit =778 ft. lbs.] Up till now petrol has proved itself to be the only suitable fuel for aircraft, as all the other fuels mentioned involved power plant of a very heavy type. Possibly a satisfactory steam plant, with flash boiler, might be evolved, and electrical motors would, of course, be ideal for aeronautical work; but so far, very little has been done with either steam or electricity.

2. Motors.

Omitting all other kinds of motor for the reasons given above, a few notes on the petrol motors now in use may be found useful.

A. General Requirements.

These are: safety, regularity of working, simplicity of design, easy to repair and maintain in working order, lightness combined with strength, small expenditure of fuel and oil, etc. They should be very securely fixed into the machines; and, in aeroplanes, should be in front of the pilot and passengers. In military machines it is sometimes desirable to have two motors, one being a small reserve motor for use in case of a breakdown; this latter being about one-fourth the strength of the main motor.

B. General Data.

Chief Types. Rotary (Gnome); vertical (Green); power from 100 to 200-H.P. on "dirigibles," and from 50 to 150-H.P. on aeroplanes and hydroplanes; but power is increasing. *Number of Cylinders*: eight to sixteen rotary; four to six vertical type. *Bore and Stroke*: 4-in. to 6-in., stroke equal to bore, to about 30 per cent. larger. *System of Cooling*: air in most cases, but water for most of the larger ones. *Revolutions*: 1,200 to 1,600 per minute. *Weight per H.P.*: including radiator, etc., for water-cooling, Rotary (air-cooled): from $3\frac{1}{2}$ lbs. for 50-H.P., to 2 lbs. at 150-H.P.; vertical (water-cooled): from $4\frac{1}{2}$ lbs. at 50-H.P., to 4 to 5 lbs. for 150-H.P., and sometimes heavier still. *Petrol Consumption* per b.h.p. hour: from .54 to .75 lbs. *Oil Consumption* per b.h.p. hour: from .005 to .17 lbs. *Silencers*: very little used; desirable for military purposes. Self-starters not much used as yet, very desirable for military purposes. *Rough rule for Power*: b=bore; s=stroke; n=number of cylinders; then at 1,200 revolutions H.P. $=\frac{b^2s}{11\,n}$ (British units) $=\frac{b^2s}{180{,}000\,n}$ (metric units). For many interesting details concerning motors, see *Flight*, 1912, papers by A. G. Clarke and H. Challenger.

SECTION VI. PROPELLERS.

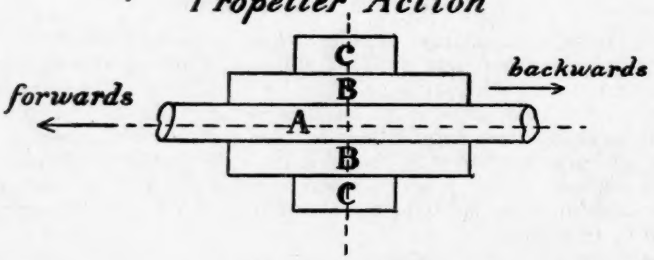
The object of all propellers is to create a thrust capable of overcoming the resistance of the aircraft to which they are applied. The actual thrust generated depends upon the nature of the stream lines surrounding the aircraft, and the capacity of the propeller for moving the air in a suitable manner; and while the nature of the stream lines is of some importance (usually allowed for by a "wake" co-efficient), the real value of any propeller depends almost entirely on its design.

1. General Theory.

All propellers may be divided into two classes, *viz.*, "driving," such as those on aeroplanes, and "lifting," like those used for helicopters, the general theory being much the same for both, although the actual types of instrument used differ materially.

Fig. 12.

Propeller Action



The mode of action of a "driving propeller" will be best understood from Fig. 12. *C* is a stationary nut (representing still air); *B*, a screw working in *C* at a velocity *v* in a backward direction (representing the backward movement of the air, or real slip); *A* is a screw working forwards in nut *B*, with a velocity $V+v$ relative to *B*, (representing a propeller). It is clear that the real velocity of *A* referred to *C* will be $V+v-v$, and this is called the real advance of the propeller. The efficiency as shown by Rankine is $\frac{V}{V+\frac{v}{2}}$

The principle of the lifting propeller is very similar, as can be seen when Fig. 12 is turned through 90°.

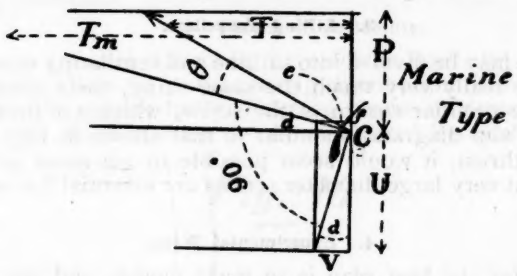
2. Driving Propellers.

The only types which need be considered are the marine and wing, as jet and paddle propellers are too cumbersome for use on aircraft.

MARINE TYPE.—Fig. 13 shows the "real pitch and slip" diagram for this class. C is the centre of pressure of a blade;

Fig. 13.

Propeller Diagram



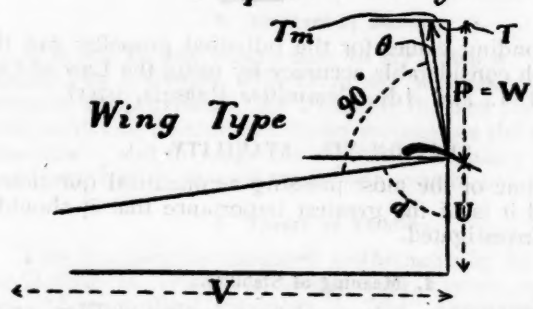
P=turning force; U=velocity of rotation; V=real advance; T=thrust, then:

$$\text{efficiency} = \frac{\text{useful work}}{\text{total work}} = \cot(\alpha+\theta)\tan\alpha = \frac{Tm}{T} = \frac{V}{V+\frac{v}{2}}$$ from

which the real slip can be found. It is clear that the less the value of θ the greater the efficiency. Practical values of E are: indifferent ·40, medium ·50 to ·60, good ·75 to ·80. The maximum thrust per H.P. $= \frac{550}{V} \times E$, so that if $E=·75$, $V=150$, then $T=2.75$ lbs. (See *R.E. Journal*, 1894).

Fig. 14.

Propeller Diagram



WING TYPE.—Fig. 14 shows the diagram for this type. P = weight of the bird (but see Sections III and VIII), θ is

always small and α large. Efficiency is very high, probably 80 per cent. at least.

APPARENT PITCH, ETC.—It is usual to base calculations for both these types, on what is called "apparent pitch," *viz.*, the pitch found by measurement of the angle of the screw face, but the results obtained are unsatisfactory, as it is not possible to calculate the effect from what is really an imaginary quantity.

3. Lifting Propellers.

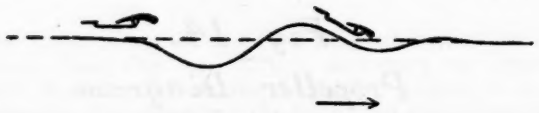
These may be divided into turbine and ventilating screw types. They are really very much the same thing, their chief feature being the peculiar design of the screw, which is of the fan type. The real slip diagram is similar to that shown in Fig. 13. As regards thrust, it would seem possible to get some 90 lbs. per H.P., but very large diameter screws are essential for successful working.

4. Experimental Work.

By far the best plan is to make models and test them in wind tunnel, etc., and find the values of *P, U, V, T,* above.

Fig. 15.

Path of Stable Machine



The corresponding values for the full-sized propeller can then be found with considerable accuracy by using the Law of Comparison (Sect. I., and *Adv. Committee Reports*, 1911).

SECTION VII. STABILITY.

This is one of the most pressing aeronautical questions of the day, and it is of the greatest importance that it should be thoroughly investigated.

1. Meaning of Stability.

This will be best understood by referring to Figs. 15 and 16, the former showing the path of a stable machine, the latter that of an unstable one. In the "stable" case, the oscillations

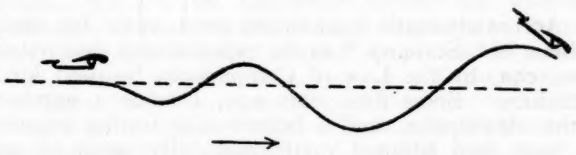
caused by a disturbance, damp out when the disturbance ceases, and the machine returns to a level path; in the "unstable" case, however, the oscillations increase, and the machine upsets. This description, of course, applies to all three classes of stability, longitudinal (pitching), transverse (rolling), and directional (yawing). The most stable machine may be considered to be the one which recovers quickest from some standard disturbing moment.

2. Causes of Instability.

These are: (a) defects in the machine itself, (b) aerial disturbances. Class (a) include wrong distribution of the weights; action of the motor; badly designed centre of pressure movements, etc. Most of these can be eliminated by careful design.

Fig. 16.

Path of Unstable Machine



Class (b) include variations of air motion, and are especially dangerous at heights below 500 ft., as even good machines cannot right themselves quickly enough at low altitudes. As very little is known about aerial disturbances, this part of the problem is exceedingly difficult to solve.

3. Standard of Stability.

It is not by any means easy to lay down a "standard" of stability, as it is very difficult to say what the maximum disturbance, likely to occur, is. Probably the best plan is to assume some particular maximum turning moment as the worst possible disturbance, and to judge the machine's stability from this, by actual test, but up to now no definite system has been adopted.

4. Theory of Stability.

This has been investigated mathematically by Prof. Bryan (see *Stability in Aviation*), the late Capt. Ferber, and others (see also "Longitudinal Stability," *The Aeronautical Journal*, January, 1910). The general method employed is, of course, similar to that used in all cases of moving bodies, and provided

that accurate experimental data can be found to complete the equations (a somewhat difficult matter), satisfactory results can be obtained. It is very desirable that the equations, etc., should be simplified as much as possible; for instance, for practical work, the angular resistances can be omitted, as the solution is then on the safe side. It should be noted that longitudinal stability is independent of the other two, while the directional and transverse are interdependent.

5. Remedies for Instability.

Many suggestions have been made from time to time for improving the stability of aircraft. Prof. Bryan considers "inherent stability" can be obtained by using a suitably-arranged tail, and certain kinds of fins, while many inventors pin their faith on gyrostatic, or pendulum control. In my opinion, by far the best results will be got by designing machines on the lines of birds, *viz.*, with flexible give-and-take supporting surfaces. The wings of birds really act as balancing fins, their peculiar construction enabling them to take up the best shape required to meet any particular kind of disturbing force.

6. Use of Models.

Accurately-made models are most useful for studying the problem of "Stability," as the experimental data obtained from them, can, by the Law of Comparison, be used for full-sized machines. Some five years ago, I made a number of tests of this description, and I believe that further experiments on the lines then adopted would materially assist in solving the various questions connected with stability.

SECTION VIII. THE FLIGHT OF BIRDS.

This division of the subject is of the highest importance, as birds are by far the best fliers at present known.

1. Classification (Aeronautical).

From the aeronautical point of view, birds may be divided into three classes; (a) sailers, (b) flappers, (c) leaping fliers. Typical birds of each class are: albatrosses, rooks, and the various small passerines.

2. The Bird as a Flying Machine.

Considered as an aeroplane, a bird has a body, wings (combined supporting and propelling surfaces), a tail (chiefly for longitudinal balance), and legs (under-carriage). Steering is done chiefly by the wings, the flexible surfaces of which are utilized to create a difference of pressure between the two sides, and thus cause a change of direction. These surfaces also, by their peculiar construction, play a great part in the

lateral balance, and by their general flexibility, so to speak, damp out the first force of gusts and other disturbances. The skeleton and muscular system of birds are, allowing for the different uses to which the limbs are put, almost identical with those of human beings; practically speaking, the same nomenclature can be used for both. The legs in the small birds are much more powerful, in proportion, than in the case of the larger ones, and this is one of the reasons why there are no very large birds. Another, as is shown by the Law of Comparison, is that the tension per sq. in. of the muscles increases as the dimensions (λ), and hence the large birds should have much stronger muscular tissue than the small ones, which is not, as far as is known at present, the case.

3. Miscellaneous Details.

The following notes (see *1st Report, Bird Construction Committee, the Aeronautical Society of Great Britain*) give some useful information regarding the dimensions, etc., of birds :—

Relation between weight and surface $\frac{S^{\frac{1}{2}}}{W^{\frac{1}{3}}} = C$; C depends on the class of bird, and varies from .25 to .60. *Weights,* lightest is humming bird = .0068 kilograms; heaviest, the Californian vulture = 13.6 kilograms. *Weight per sq. metre,* smallest, the swallow = 1.16 kilograms; and heaviest, great northern diver, 27.1 kilogram. *Span of wings,* smallest, common sparrow = .17 m.; largest, wandering albatross = 4 m. *Weight of muscles,* mean = $\frac{1}{8}$ of weight of bird. *Wing beats* per sec., these vary considerably; the larger the bird the smaller the number of beats. *Tip speed of wings,* about 3.3 metres per sec. (Lindenfeldt).

4. Velocity of Birds in Flight.

This varies very considerably, and is extremely difficult to measure. The following are good estimates :—Wild duck, 47.8 miles per hour; partridge, 32 miles; grouse, 40 miles; rook, 24 miles; swallow, 15-25 miles; pelican, 30 miles; starling, 46.5 miles; pigeons, homers, normal, 41 miles, very fast, with favourable breeze, 68 miles.

At high altitudes, owing to the reduction in density of the air, speeds may be very much greater; for instance, if the ground speed of a bird were 50 miles per hour, it would require to fly at 137 miles per hour at 53,000 ft., and so on. Speed can also be considerably increased by reducing the area of the wings. Many birds do this, and since speed varies as $\frac{1}{\sqrt{\text{area}}}$ an increase of from 20 to 30 per cent. can be obtained by so doing. It is very difficult to say what the maximum speed of birds really is; probably it does not much exceed 60 miles per hour, near the earth; the high speeds reported on migration are probably attained at very high altitudes.

5. Power Expended in Flight.

Of this very little is known. The following results, obtained by various observers, from measurements of the gliding angle, are probably fairly correct:—Stork at velocity=36 ft. per sec., 34 ft. lbs. of work per lb. of muscle; same at 66 ft., 69 ft. lbs.; rook at 36 ft., 26 ft. lbs., etc. Some authors, such as Tatin, consider the work done to be very much less: possibly only one-tenth of the above.

6. Different Kinds of Flight.

The principal acts are: gliding, flapping and soaring; while flight manœuvres are: turning, ascending and descending, hovering, leaping flight, starting and alighting. Most of these need little description; but there is an almost endless variety of opinion as regards soaring. Personally, I consider that it can be done in two ways: first, by using the ascending currents which so frequently exist where soaring is practised; and secondly, by taking advantage of the almost equally frequent "gustiness" of the wind. The condition of the air in both these cases is quite sufficient to account for soaring, and this type of flight is simply due to a skilful combination by the bird, of the air force, with its own weight. No energy is expended by the bird, which really, so to speak, extracts power from the movements of the air (see my lecture, 1892). As regards hovering, some of the small birds, like the humming bird, can undoubtedly hover in still air, but the larger ones, like the kestrel, only seem to be able to do so, in, at least, a light breeze. Leaping flight, is a sort of combination of flapping and gliding, and is only practised by the smaller passerines. It should be noticed that considerable extra power is required for starting and ascending, as the bird has to overcome the inertia of its mass.

7. Remarks.

The chief points to notice about bird flight are the high speed, stability, and general handiness of birds. These advantages are entirely due to the skilful manner in which they are constructed and designed, the most important feature being the flexible wings, with their give-and-take action, which ensure easy propulsion, stability, and good turning power.

SECTION IX. METEOROLOGY.

The study of this subject is of great importance to aeronauts, as much of the success of aircraft depends upon the state of the atmosphere at the time a flight takes place.

1. Information, etc., Required.

The atmosphere is a mass of air surrounding the earth to a height of some 200 miles or so. This mass is, generally speaking, in a state of very variable motion, and the object of the

meteorologist is to predict, some time beforehand, what the condition of the air will be. In order to do this, charts and tables, showing temperatures, pressures, wind directions, etc., are prepared, and from these the probable weather some short time ahead is foretold. It is obvious that the accuracy of the forecasts depends almost entirely on the amount and quality of the information received, and its timely arrival (see *Weather Forecasting*, by Dr. Shaw, F.R.S.).

2. Method of Work.

The subject is one of great difficulty, as forecasts are required for the higher atmosphere, as well as for the air at the earth's surface. The general principles upon which each is based are given below :—

AT THE EARTH'S SURFACE.—Two methods are used, *viz.*, "Synoptic Chart" system, and the "Statistical Chart" system; the former being the more important.

SYNOPTIC CHARTS.—In this system, the necessary information regarding pressure, temperature, humidity, rainfall, etc., is sent in to the central headquarters in London at fixed hours daily, from a number of stations scattered about all over the country, from certain stations abroad, and from ships at sea. From the details thus received, charts showing pressure lines, temperature lines, etc., are prepared very much on the principle of the contour lines on maps. An inspection of such maps shows that these contour lines take up certain peculiar shapes, and that such shapes always accompany certain kinds of weather. A skilled forecaster can, by comparing a number of charts, see how the forms vary, and at what rate such variation takes place, and then predict the likely weather at his station for, say, 24 hours in advance. It should be noted that forecasting is especially difficult in this country, owing to the want of information about the Atlantic Ocean area, but, with more wireless communications from ships, and by the use of well-equipped "dirigibles," this inconvenience should be considerably minimized.

STATISTICAL CHARTS.—Many efforts have been made to foretell the probable weather from the average temperatures, pressures, etc., taken over long periods, say, 100 years. Unfortunately, the weather in this country is so variable, that the "average values" for any particular date are not of much use, but the system is useful as giving a general guide to the weather about a particular period. Useful tables for this class of chart have been drawn up by Mr. Manning. (See *Flight*, 1911.)

In connection with these charts, the tables drawn up by Captain Bouttieaux (see *La Météorologie appliquée à l'Aérostation*) and in *How to Forecast the Weather* may be mentioned. These tables give the probable weather, for different kinds of wind, when the readings of the barometer are known, and will

be found of some service by aeronauts, as although the forecasts may not be very accurate, a careful observer learns a good deal about the weather, when working with them.

UPPER ATMOSPHERE.—A great deal of work in connection with this branch of the subject has been done by means of sounding balloons, kites, etc. (see *Weather Forecasting*, by Dr. Shaw, F.R.S.). Both balloons and kites are fitted with automatic recording barographs, thermometers, etc., and from these the state of the air at a given moment can be told. Some of the balloons have reached great heights, 15 to 18 miles.

It is very difficult to lay down any definite rules regarding the condition of the upper atmosphere, as its state varies with the time of the year, day, place, the heat of the sun, etc. In a general way the most irregular motion of the air is at levels under 1,000 ft., and it is these disturbances which interfere so much with starting and alighting. Probably on a good flying day the wind is fairly regular at about 2,000 ft., but this, again, depends upon the character of the country, whether level, hilly, mountainous, etc. There is usually considered to be less disturbance over the sea than over land. As regards temperature, there is a fall of about 1°F. for every 300 ft. of elevation up to about seven miles, beyond which it appears to remain stationary up to a considerable height, but here, again, everything depends upon the conditions of the case. The velocity of the wind increases rapidly with the altitude, but how much, if the altitude is great, is not yet known.

SECTION X. WIRELESS TELEGRAPHY.

A good deal of work has been done in this direction during the last three years. German "dirigibles" can now communicate up to some 300 miles, and, as explained below, it seems quite possible to equip aeroplanes with instruments having a range of 70 miles or so. On account of its want of secrecy, telephony is not in favour; practically all the systems employed, Marconi, Poulsen, Telefunken, etc., use the Morse code, with a key for sending and a telephone for receiving. It should be noted that "wireless" is very useful on board airships for checking chronometers, and finding the position of the ship by the three-point problem of surveying.

1. General Arrangements.

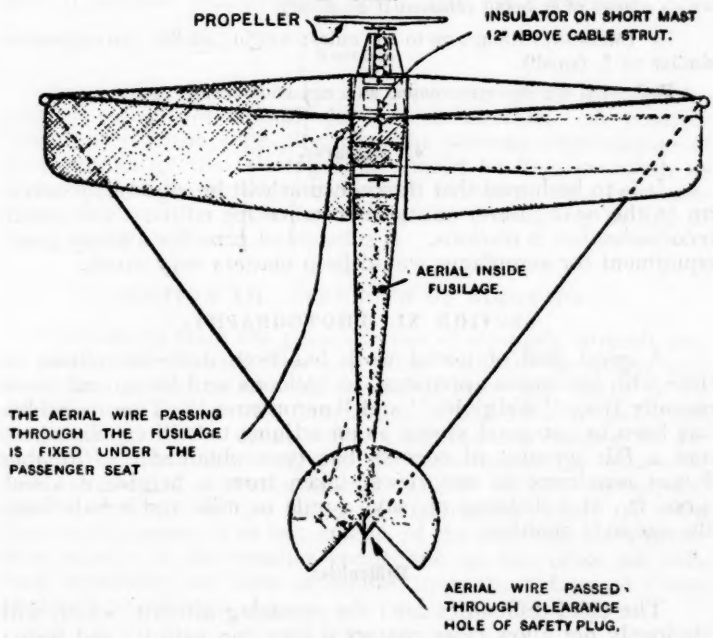
These usually consist of stations on board the various aircraft, and land and sea stations at the headquarters of the military and naval forces. A station consists of four main parts, *viz.*: the *aerials* (radiate and collect the waves); the *transmitter* (generates the waves, and regulates them); the *receiver* (collects the waves, detects their movements, and records the results on a telephone); and the *switch* (adjusts the instruments for sending or receiving). The chief difficulties

from the aeronautical point of view are the weight of the apparatus and the aerials. In a "dirigible" the weight is not of much importance, as there is usually ample lifting power available; but in aeroplanes this is not the case, and hence the weight must be reduced as much as possible. For both classes of machines the aerials are generally trailing wires, arranged with a slip joint in the event of their catching in trees, buildings, etc. In the case of the airships the metal framework sometimes takes the place of one aerial.

FIG. 17.

THE "MARCONI" WIRELESS (AEROPLANES).

L TYPE.


PROPELLER
INSULATOR ON SHORT MAST 12" ABOVE CABLE STRUT.
AERIAL INSIDE FUSILAGE.
THE AERIAL WIRE PASSING THROUGH THE FUSILAGE IS FIXED UNDER THE PASSENGER SEAT
AERIAL WIRE PASSED THROUGH CLEARANCE HOLE OF SAFETY PLUG.

2. Application to "Dirigibles."

The Marconi Company has kindly sent me plans, etc., showing their wireless equipment for "dirigibles."

1½ *K.W. Set.*—Total weight about 293 lbs. It consists of the following parts:—Transformer (108 lbs.); condenser, 52½ lbs.; transmitting jigger, 30 lbs., with receiver, change-over switch, key, spark gap, and choker. The whole apparatus occupies a space of 36 in. by 32¼ in. by 22 in. The arrangements for the aerials depend upon the particular kind of "dirigibles." Approximate range, 300 miles.

3. Application to Aeroplanes.

The Marconi Company has also kindly furnished me with information as to their latest aeroplane equipment. There are two types L (small) and L1 (medium), the first being intended for use on the smaller class of machine, the second for use on passenger-carrying ones.

L (SMALL): Range, 10 to 15 miles; total weight, 50.5 lbs., distributed as follows:—Generator (accumulators), 26 lbs.; receiver, 12 lbs.; transmitter, 12 lbs.; switch, ½ lb. As regards fitting on the machine, transmitter and receiver are just in front of the pilot, accumulator under the seat, switch on left of pilot, aerials as shown in Fig. 17. The key protrudes through the cover of the transmitter; the trailing aerial has a safety plug, which allows of it being released if necessary.

L1 (MEDIUM): Range, 70 to 100 miles; weight, 200 lbs.; arrangements similar to L (small).

Both sets are strongly made, and can stand rough usage.

4. Remarks.

It is to be hoped that this question will be vigorously taken up in the near future, as its importance for military and naval reconnaissance is obvious. A substantial prize for a really good equipment for aeroplanes would help matters very much.

SECTION XI. PHOTOGRAPHY.

A good deal of useful work has been done from time to time with automatic apparatus, in balloons and kites, and more recently from "dirigibles" and "aeroplanes." The main idea has been to get good views, as an adjunct to military sketches, and a fair amount of success has been obtained. Probable future requirements are views, taken from a height of about 4,000 ft., at a distance of, say, a mile or mile and a half from the enemy's position.

Difficulties.

The chief difficulties are: the opposing aircraft, which will obviously not allow close contact if they can help it; bad light; and movements of the aircraft on which the photographer is working. The light question is a very troublesome one in this country, as it is almost impossible to take good snapshots during nearly half the year, while even in summer only certain hours in the morning and afternoon are suitable. Movements of the aircraft are not so important in "dirigibles," as these machines can stand still, but in "aeroplanes" they cause a great deal of inconvenience, and really good views, at long range, are by no means easy to obtain. Too much must not at present be expected from photography; the pictures are only a useful adjunct to an observer's report.

General Arrangements.

The equipment consists of two parts, *viz.*, that on the aircraft, and the developing and enlarging equipment at the headquarters of the military and naval services. The former need only consist of the camera, spare plates, etc., as it is not worth while developing on board, even when it can be done. As regards the class of camera, telephoto work hardly seems possible, as long exposures and a very steady platform are necessary. Probably a good anastigmatic lens and camera, ¼ or ½ plate size, held by the operator, with quick-acting plates, will give as good results as can be expected. The ground equipment need not be of any special type, but it should be able to produce enlargements up to, say, six diameters.

Remark.

It would be an advantage if a prize were given for a photographic equipment suitable for use on aircraft. A possible development of photography, *viz.*, the wireless transmission of photographs by the telectograph, should be kept in mind, as it would then be possible to transmit sketches, etc., from airships direct to the ground stations, the developing being, of course, done on board.

SECTION XII. STRENGTH OF AIRCRAFT.

Considered from the point of view of strength, aircraft are, of course, very much like any other built-up structure, and once the maximum stresses to which they are likely to be subjected are known, the dimensions of the different parts can be calculated in the usual way. Unfortunately, owing to our want of accurate knowledge of air movements, the nature of these stresses is almost unknown, and it is only by careful experiment that we can hope to understand them. A very good arrangement is to test models of the different parts under what appear to be working conditions, as the effect on full-sized machines can then be found from the "Law of Comparison" (see Section I.).

1. "Dirigibles."

As regards "dirigibles," the main points for consideration vary very much with the class. With the rigid type, the framework is a metal structure, which must not only be strong enough to carry the various weights, but must also be able to stand the heavy strains caused by winds striking it sideways, etc. In the flexible type, the bursting strength of the envelope, and the powerful stresses acting on the latter, due to the system of car attachment, are of the first importance, while the car itself, especially if it is a long one, requires very careful designing.

2. "Aeroplanes."

In these, the wings, or supporting surfaces, are really cantilevers, and while it is easy to design them to bear ordinary stresses, it is by no means easy to provide for the peculiar forces which strain them when the machines are in the air. These forces often act in most unexpected ways, not only bending the wings, but twisting them across their lines of greatest strength, and subjecting their component parts to strains which, at present, seem almost incalculable. This is specially the case with monoplanes; and biplanes are nearly as bad, but the bridge-like design of these latter saves them to a certain extent. The remedy is, as pointed out above, to construct the supporting surfaces on the lines of birds' wings, which adapt themselves easily to the various air movements, and thus minimize the strains referred to.

SECTION XIII. USES OF AIRCRAFT.

These may be considered under the headings of "Sport," "Commerce," and "War."

1. Sport.

A great many races and prize competitions have taken place during the past few years, and much useful information has been gained from them. It is greatly to be hoped that further developments along this line will take place, as these races, etc., tend to bring out new ideas, and to prevent the stagnation which is so inimical to the progress of any science.

2. Commerce.

So far, aircraft have not proved very successful from the commercial point of view. In some cases, such, for instance, as the Zeppelin airships, a certain amount has been made, by carrying passengers; but as yet, it has not been found possible to establish a regular "flying" line, and it is doubtful whether there is, at present, any prospect of such an enterprise paying.

3. War.

The chief use of aircraft, however, is, as I have for many years pointed out, for war. This is at last being slowly realized by all nations, most of whom are making efforts to organize "Air Forces," which will fight in the air, and form the first fighting line of the warlike forces employed in future campaigns. It is not, of course, possible in a lecture like this to discuss the organization and work of these "Air Forces" in detail, but I should like to draw attention to two very important points, *viz.*, the division of duties belonging to the different war forces, and the necessity for the separation of the "Air Forces," from those employed on land and sea.

DUTIES.—In all war, the object is to deal the enemy a crushing blow as rapidly as possible, so as to destroy, not only his fighting troops, but also, all means of supplying and recuperating them, both as regards men and stores. To effect this, the duties of each branch of the "Warlike Forces" must be clearly defined, and the following is a suitable allocation of work:—

AIR FORCES.—Gain the command of the Air by destroying the enemy's aircraft, etc., and thus allow the "Land" or "Sea" forces to advance.

SEA FORCES.—Destroy the enemy's fleets, and prepare the way for the advance of the "Land Forces."

LAND FORCES.—Invade the enemy's country, strike the final blow, and effectually prevent any further action on his part. Of course, complete co-operation between all the services is absolutely necessary, but it is obviously desirable to lay down, at least generally, some kind of rules as to what the action of each should be.

ORGANIZATION OF AIR FORCES.—There is little doubt that the time has now come for the separation of the "Air Forces" from the "Land" and "Sea" services. To gain the command of the air, perfect freedom of action is necessary, and this they can never attain as long as they are looked upon as mere adjuncts to the other branches of the country's war forces. A separate organization, with its own Commander-in-Chief, is essential for success, and it is to be hoped that this will be realized before it is too late to take action in the matter.

Concluding Remarks.

I think it is unfortunate that the suggestion I made in my last lecture, *viz.*, to appoint a Royal Commission to report on the question of flight, was not carried out. A report by a really authoritative body, such as I proposed, would have been of great public interest, and very beneficial in many ways, while it would probably have induced commercial men and others interested in the subject to have taken up "Aeronautics" in a far more vigorous manner than has actually been done.

As regards the future, the chief matters now requiring attention are: extension of scientific research work, improved construction of aeroplanes on bird lines, development of the hydroplane, thorough investigation of the stability question, careful study of the principles of bird flight, and further and more detailed exploration of the upper atmosphere. All these problems are of vital importance, and their early solution should be hastened on as much as possible.

APPENDIX I.

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APPENDIX II.

1. ARMOUR FOR AIRCRAFT.—It does not seem possible to do much in this way, except as regards the cars of " dirigibles " and the bodies of " aeroplanes," both of which can, without much difficulty, be protected from rifle, or small gun fire. Armour is, however, out of the question for the envelopes of " dirigibles," and as its application to the supporting planes of the present type of " aeroplane " would certainly interfere with the warping and steering arrangements, it does not seem likely to come into use in such cases.

2. GUNS ON AIRCRAFT.—Firing from " dirigibles," when light guns are used, should not be difficult, but fire from " aeroplanes " requires very careful consideration, as with such light machines the force of recoil might seriously affect the stability. The guns should be mounted in recoil cradles, and as far as possible so fixed, that the line of action of the force of the recoil passes through the centre of gravity of the machine. The effect of gun fire can be safely tested by hanging up the aeroplane (with spring cables) to an overhead beam, the forces exerted upon it being found by the cinematograph method (see Captain de Labouret's paper, Appendix to *Le Vol des Oiseaux*, Marey). The shells used against dirigibles should be designed in such a manner as to explode the hydrogen in the envelope, when certain compressed gases carried in the shell meet it.

3. DESIGN OF SUPPORTING PLANES.—The present types can be very considerably improved upon. As far as my own experiments go, it seems to be quite possible to get a ratio of lift to drift of 30 to 1, instead of the present maximum of about 14 to 1 (M. Farman type).

DISCUSSION.

Mr. José Weiss, in opening the discussion, said: I have come absolutely unprepared; I did not expect to be called upon to speak. As the Lecturer has told you, I have carried out a good many experiments with models, and I may be able to impart a little information which will be of interest to you. The primary object of these models, of which I have made a very large number, I daresay something like 200 or 250, has been to find out the laws that govern the flight of birds, especially the sailing flight. I began this work a great many years ago; in fact, I have been at it all my life. I made my first attempt when I was quite a youngster. In those days absolutely nothing was known, and some of the models, photographs of which you have seen here this afternoon, were made as far back as 1906, long before successful flights had been made. My main object in making the models was to find out how it is that birds can sail so easily without any power at all; and in my opinion, up to the present, that is really the point on which least is known in the way of flying. There can be little doubt that flight can be performed with very much less power than is actually used now. Flying, as it is done at present, rests simply on huge power, whereas we see in Nature birds flying with next to no power at all. It is really a very deep subject. My own experience is that if we can only make machines in which we can manage to reduce what is called the drift, that is to say, the resistance to penetration, we must eventually get things which will fly with very much less power. Mr. Keith and myself are working hard at the present moment to evolve a machine that will fly under man-power. That is an exceedingly difficult thing to do, the greatest difficulty about it being to produce a thing which offers no resistance.

RESISTANCE TO PENETRATION.

Some little while ago I met Mr. Coanda at Bristol, and he showed me some photographs of a bird in that clever machine of his, by which he is able to photograph air. This is a very ingenious device, by which fillets of smoke are passed round any object which is placed in it; any speed can be imparted to these fillets, and you can see all the currents which are created round the object. He has experimented with a large number of objects, and has found that they all invariably set up eddies. But in one photograph he showed me he had used a stuffed bird in the attitude of flight, and the curious thing is that the fillets of air pass round the bird, close immediately behind it, and then go straight on: there is not a single eddy produced. There is a great lesson in that. It shows that the bird offers practically no resistance whatever, barring skin friction. That has been my idea for a great many years, and it leads us straight to perpetual movement—at least, very near to it. If we conceive a body which is falling in which the resistance to penetration is absolutely nil, and which, through speed, can get a certain amount of lift, as is the case with a curved surface irrespectively of incidence, it is evident that the speed must increase as long as that body follows a descending trajectory. Therefore, since there is a certain amount of lift produced from that increased speed, a falling body is bound, after a time, to reach the mean, which is the horizontal in this case, and since there is no resistance to penetration, the speed and direction of trajectory are naturally kept up. In theory, it should be perpetual movement, but as the shape cannot be so absolutely perfect as to offer no resistance at all, and as skin friction

is always present, we can only approximate to perpetual movement, but we can in that way account perfectly well for the sailing flight of birds. The falling angle in the most perfect birds might be anything between 1 in 50 or even 1 in 100. In that case their mysterious feats are quite easily accounted for, because the air can never move in an absolutely parallel direction; there are bound to be undulations. Anywhere, even without any particular feature on the ground to cause ascending currents, there are bound to be in most cases slightly ascending currents sufficient to support a bird, and to enable it to perform those feats which seem to us like perpetual movement. Ascending currents are explained easily enough, wherever there are mountains or other obstacles to the wind. But there are numerous other factors, such as heat, light, electricity, humidity, all of which are capable of producing slight ascending trends sufficient to account for the soaring feats of birds, when it is considered that a rise of only a few inches per second is all that is needed.

SHAPE OF THE WING.

As aeroplanes are constructed at the present time, the fittings, stays, and chassis produce a tremendous amount of resistance, but above all, what produces resistance is the shape of the wing. It is a notable fact, that although aeroplane construction has advanced by leaps and bounds in the last two or three years, there is one direction in which it does not seem to have advanced in the least, and that is in the shape of the wing. The little experiment by Mr. Coanda shows plainly that in that lies the greatest problem of all. I know that from my own experience. Supposing, for example, I want to make two models. I make one, and it goes perfectly well, and if I try to make another one, perhaps larger or smaller or of the same size, and I try to make it as like as I can to the other one, I find that the results are totally different. Perhaps at first it will not go at all. I may think at first that it is due, perhaps, to some little projection, or to the shape of the body, or something like that, and these defects, when altered, will make scarcely any difference; but if you just give a slight twist to the wing, or just lower the front edge, or raise the rear edge, or make a slight alteration in the shape of the wing, a huge difference is brought about, which shows that the greatest resistance is not so much in the body, nor in the minor part, but is due to the shape of the wings. I have not the least doubt, that if we wish to make the science of flight advance, the students of its scientific side should make great efforts to try to find out exactly the particular point which causes one wing which is nearly like another, to fly ever so much better, or ever so much worse. The problem is to find out the critical point in each and every feature of a machine. Take any feature you like—the relation of weight to surface, of span to width of wing, of the size of the body to the area, the relation of rigidity of some parts to elasticity in others—all these features and a great many others have a critical point. For instance, you can raise the weight per area up to a certain point, and you get greater and greater efficiency; but if you go just above that point, the efficiency goes down. It is just the same with all the features connected with aviation.

The whole secret of making a thing that approaches the bird, is in getting all these critical points just right, and in correct relation to one another; but it is a huge problem, and it is only those who have tried it who realize how exceedingly difficult it is. To begin with, these experiments take a very long time, depending on atmospheric conditions.

There is always something or other that goes wrong just at the last moment. The last time Colonel Fullerton came on one of his visits, it never stopped raining the whole time. I was hoping to show him a really fine model, which I knew was a very good one indeed, but by the time we got to the flying ground the model had been soaked for a couple of hours, with the result that the canvas had stretched the thing out of shape, and it would not perform at all. That is quite an ordinary occurrence. I am one of those who do not believe very much in war, and I am sorry to see that the whole of our work nowadays goes in that direction. I should like to see greater efforts being made to develop the aeroplane from the point of view of a commercial conveyance. I myself am absolutely convinced that large machines are perfectly possible, and I am quite convinced that in five, six or ten years we shall see large machines carrying upwards of fifty or a hundred passengers at a time, and performing direct services between all the capitals of the world. I believe that is one of the main benefits to be derived from the aeroplane—that instead of helping us in war, it will lead people away from war, and increase the friendly relations between nations.

Dr. T. Miller Maguire, M.A., LL.D.: Whatever may be the future of aeroplanes, whether they are ultimately going to carry passengers or not, I think we in this Institution are interested in them from a military point of view, and accordingly I think that the concluding remarks of the Lecturer are of vital importance to this nation at the present time. If we are not very badly misinformed, our progress in that way has been extremely backward as compared with that of other Powers. This is what a leading writer says:—

> "When one considers that France started 1912 with 218 army aeroplanes in flying order, and bought just over 400 more, really modern machines, for the army alone, before the beginning of 1913, one begins to see the tragic absurdity of the British fighting force of 13 aeroplanes, with about 30 officers to fly them."

I contend that we, as a nation, ought to be first in every sphere of warfare. We have ample funds and mechanical resources. Since the end of August, four Deperdussin monoplanes, four Flanders monoplanes, and one Blériot monoplane, ordered before the ban was put on this type, have been accepted for the Royal Flying Corps, but it was officially admitted that some of these might have to be altered in accordance with the Report sent in by the Committee about September last, to investigate the causes of certain accidents to monoplanes; yet it has been stated in the House of Commons that the Military Wing has 26 aeroplanes in flying order! I think it is a sad thing to have to say in this meeting that we are not much superior even to Greece with regard to the command of the air. This island nation is inferior to Greece and Bulgaria, let alone France and Germany, and I suggest that we should cease to be so inferior at once to any Power.

Mr. J. W. Ridsdale: Under the present system of recording observations from aeroplanes, which is by writing only, it seems to me that it is almost impossible to get a proper and true record of all the things necessary. I do not know whether anything has been done to surmount these difficulties, but I am interested in a log by which flying is timed to the second from starting. It is worked on the dial principle, with an indicator

which prints on the chart the compass direction, and all the observations which it may be necessary to record. I should like to know whether that would be of any use to an aeroplane scout, because I think there must be some difficulty from the point of view of cold, in addition to vibration and such like matters, in writing up in the air. I will hand one of these charts to the Lecturer, and I shall be glad to have his opinion on it.

Colonel H. S. Massey, C.B.: I have only a very few words to say, but they are words of encouragement to those who wish to impress upon us that the chief study in the construction of an aeroplane is the shape of the bird's wings. Birds keep their balance well, but fishes also keep their balance; and it will be a great encouragement to those gentlemen who are so eager in studying the subject of birds' wings, to know that the designer of the first Dreadnought obtained his ideas from calmly contemplating a Yarmouth bloater on his breakfast table. I think that ought to be a matter of great encouragement to bird fanciers; and I trust that the endeavours of our military aviators may be turned into this very useful channel. I think it is a matter of great encouragement to know that the Navy, in the construction of our Dreadnoughts, made great use of the shape of the fish.

Mr. George Albree: As an expression of gratitude for the courtesy which has been extended to my son and myself to listen to this very interesting paper, may I accept the first opportunity of a life-time of addressing an English audience? And in that address may I carry just a word of hope in declaring that, as the result of three years most careful research in studying the flight of birds, my son and his co-worker have found what they believe to be the inherent stability of monoplanes, both lateral and longitudinal? They rest the result of their investigations solely upon that at the present time, although the tests which have been made with working models would seem to justify still further conclusions.

AERONAUTICAL PROGRESS IN THE UNITED STATES.

Reference has been made to the work which your Government has done in the matter of aircraft in comparison with the work of other nations. I refer with great regret to the humiliating appropriation made by our Government during the past year of less than £40,000—I think considerably less than £40,000—per annum, and I think our equipment hardly equals that which has been referred to on the part of this country. The work which has been done by the recent administration under President Taft in the appointment of a Laboratory Commission is perhaps one of the strongest steps forward which has been made, and one which is a cause of much encouragement to those who are engaged in the study of this work. On that Commission are the leaders of thought and action in our Government to-day, heads of colleges and technical institutions, together with those in the Army and Navy who stand foremost in that work. It has been my pleasure within the past three or four months to confer with those who are at the head of aeronautical matters, both in the Army and Navy, and we found that their hands are practically tied in the matter of the character of the appropriation so far as co-operation with those who are interested in the development of this tremendously interesting study are concerned. We have hopes, however, for the future. Just before we left home, we were advised, on what seemed to be authentic information, that some of the foreign Governments had stopped the flight

of monoplanes on account of the tremendous loss of life of those who were engaged in the work, both in the Army and the Navy. We have found since our arrival here that those reports appear to have been somewhat exaggerated. At the same time the object of our visit was to bring, if possible, to the attention of some of the foreign Governments the result of the work which these young men in whom I am interested have been engaged for so many years; and I think we are justified in saying that the highest authorities in matters aeronautical who have had the privilege —and they are very few—of seeing these models are very favourably impressed with the simplicity, the birdlike construction, and the results attained by the models which have been constructed. Machines will probably be put in flight by these young men inside of four weeks, which, we believe, incorporate all the principles which we think are embodied in the designs which have been prepared. I hope I violate no confidence when addressing an audience of this kind in saying that an opportunity will be given to the British Government to acquire at least to the honour of these young men, if not to some financial advantage, the results of their work for the past three years, which seem to us, who have had an opportunity of studying it most carefully, to be most gratifying, and to follow precisely along the lines of research which has been suggested by your honourable speaker this afternoon.

The Lecturer (Colonel J. D. Fullerton, R.E.), in reply said: There are a few points to which I may further allude. Mr. Weiss has explained to you his views regarding the design of supporting surfaces or wings; and I can only say, that on this subject I quite agree with him.

As regards Dr. Miller Maguire's questions, I must explain that in this lecture I purposely omitted questions concerning the organization, training, etc., of the "Air Forces," as their inclusion would have made the lecture much too long, but I hope that these very important subjects will be dealt with at this Institution later on. I may, however, say here, that the provision of suitable "Air Forces" is simply a question of money. Speaking of some 20 years' experience of aeronautics, I have no hesitation in saying that if ample funds are forthcoming, there is no reason whatever why this country should not have just as good an "Aerial Force" as any other. We have plenty of suitable men, plenty of good constructors, capable of making any class of machine required, and the success of the whole thing depends simply upon whether the Government will make the necessary grants, to enable the organization, training and equipment of such forces to be put on a sound footing.

As regards Mr. Ridsdale's remarks, I understand he purposes to use an automatic apparatus, for recording the movements of aircraft, while in the air. Something of this kind was tried in the Military Aeroplane Competition, 1912 (see Section I. [3] above), and it is, of course, obvious that a good, practical instrument of this kind would be very useful. Mr. Albree's remarks point to the necessity for making machines stable: with this I quite agree, but in my opinion, stability depends chiefly upon the *design of the supporting surfaces* of the machine; speed, automatic balances, etc., being minor factors in the question.

There is one little point I should like to mention in connection with the "hovering" of birds. It has generally been supposed that the birds, except humming birds and such like, could not hover in still air. This does not seem to be the case. A few days ago I saw some sparrows being fed by hand, and they were "poising" just like a

bee before a flower. Their bodies were almost vertical, and the mean plane of their wings (which they flapped vigorously) was very nearly horizontal. The poising lasted quite two or three seconds; they then darted forward, made a snatch at the piece of bread, and flew off, the whole of the motions being done, apparently, with the greatest ease. I mention this, because "hovering" may in the near future become a very important question.

The Chairman (Major-General Ruck, C.B., R.E.): I anticipated that we should have had some, what I should call, more general discussion, but the subject is a very large one, and I have no doubt that people are therefore chary in getting up and discussing it generally. I am sure you would like me, on behalf of everybody present, to thank the two strangers, Mr. Weiss and Mr. Albree, for coming here and giving us the benefit of their experience. Mr. Albree's comparison of the enterprise, or the want of it, shown by the United States with that of the British Empire in the matter of aeronautics, was very interesting.

If I may be allowed to take the subjects dealt with by the Lecturer in the order given by him, under the heading, "Aeronautical Investigations," I have very little to say. It appears to me that, generally speaking, the mathematicians have not at present led us to any original development in aeronautics. At the same time there is no doubt they have done very useful work. It seems to me that the mathematician rather follows than leads the designer. He works out the various strains and stresses, and offers suggestions for trials and experiments where the data are insufficient.

SCIENTIFIC RESEARCH.

Then we come to the question of scientific research. I think there is an immense field for scientific research, both physical and meteorological, and we could not have had a better example of that than Mr. Weiss' remarks as regards bird flight. He showed in a very few words what a very large field there is there. I think that the more one has to do with aeronautics, and the more one studies the subject, the more one feels that one ought as far as possible, as the Lecturer said, to follow the flight of birds. But that requires a considerable amount of labour, time and money. With regard to physical and meteorological experiments, it is a matter of congratulation to us that we have in this country two very important Government Departments, the National Physical Laboratory, and the Meteorological Office, and I know from my own knowledge that the heads of those two Departments are most keen on work connected with aeronautics. I saw Dr. Glazebrook, the head of the National Physical Laboratory, a few days ago, and he told me that in three years his establishment had increased from 23 men to about 123, and that that is not nearly sufficient to keep pace with the work he will have to do very shortly. Of course the funds of these Government institutions are limited also, and we shall have to trust, as we always have to do, to private enterprise to a great extent to supplement them. I believe very much good might be done at the present time if a fund could be raised solely for the purpose of conducting experiments to secure greater safety for aviators. I have always been strongly of that opinion, and I hold it more strongly now than ever I did before.

THE EXHIBITION AT OLYMPIA.

Time will not admit of my making any long allusion to the various types of dirigibles and aeroplanes described by the Lecturer. The Exhibi-

tion now being held at Olympia increases the interest which his remarks have afforded, and I submit that this Exhibition reflects the greatest credit on the designers and manufacturers of the aeroplanes and the models which are there shown. There are a certain number of foreign exhibits, but the majority of exhibits are British, and I think the British manufacturers have done themselves great credit. I am sorry to say they have not received nearly the same encouragement that manufacturers and designers have received abroad, but I think they have shown, as Colonel Fullerton said just now, that they are fully capable of tackling any orders they are likely to get, and a good deal more.

I am quite in agreement with Dr. Maguire and everybody else connected with aeronautics, in wishing that far greater expenditure should be made on the Flying Corps.

DIRIGIBLES *versus* AEROPLANES.

There is one subject I should like to make a few remarks about, on which I do not alotgether agree with the Lecturer, that is the question of airships *versus* aeroplanes. The Lecturer remarked that he did not think dirigibles would be of very much use in war. He, however, qualified that subsequently by saying, " until larger aeroplanes are built," and that qualification practically agrees with my own views. My own opinion at the present moment, taking it for what it is worth, is that airships like the Zeppelin are now the Dreadnoughts of the air; and although I am keenly expecting the advent of the destroyer aeroplane, yet the difficulties of mounting powerful guns, with a sufficient crew to man them, on strong enough machines to support the guns and the crew, are so great, that I am afraid it will be some considerable time before a satisfactory type is evolved. I am all the more confirmed in this view by some conversation I had the other day at the opening of the Aero Show, with some of those best qualified to give an opinion on the subject.

One very eminent aeronautical authority gave it as his opinion that the size of aeroplanes could not be greatly increased for some years, the great difficulty, in addition to the question of alighting and ascending, being that in order to secure sufficient stability, high speed is essential; in fact, he looked upon the present speed as inadequate, his opinion being that it should be about 100 miles an hour. In order to secure that speed, however, he did not see his way to increase the size and weight, which must be kept down. He did not suggest that aeroplanes would not be made much larger and more powerful in the future, but he said that a large amount of experimental work would have to be done, and that it must take a considerable time, and he did not think that this could be accomplished for some years to come.

The latter argument also applies to the mounting of guns on aeroplanes. This is quite a new departure, and it is by no means certain what is going to happen when a gun is fired from an aeroplane. I think very few people have tried it—I am not sure that anybody has tried a shell gun. That difficulty has to be overcome. It must be remembered that you have got to fire in all directions, and as the aeroplane is swaying and twisting, it is not an easy job. At present the advantages of the airship, in addition to those named by the Lecturer, are its much larger and steadier platform, with its greater gun power, and its less dependence upon the physical power of one man—the pilot; and these seem to me to outweigh the argument deduced from the size of target and possibly its inferior speed. According to all accounts, also, the dirigible is much

better able to keep the air in average weather. I remember perfectly well in the old days, the arguments that were used when torpedo boats first appeared, and how similar they were to those that are now used with regard to airships and aeroplanes. When torpedo boats first appeared the end of all the battleships was prophesied. Very much the same argument has been used as regards aeroplanes. I do not mean to say that the big dirigible is not, comparatively speaking, more vulnerable than the battleship, but I think the same arguments apply to a large extent. I hope, however, it will not be assumed that I am hostile to the aeroplane; in fact my view is very much the other way. I believe that the ultimate solution of the problem lies more in the direction of the aeroplane than the present design of airship, and it is even possible to imagine that in the far future there may be some combination of the two.

For military purposes, however, I do not think any type of aeroplane will be really satisfactory unless it is efficiently armed, and necessarily a good deal stronger and larger than it is now. At the present moment I do not think any aeroplane has ever been built that will make a good fighting machine. I should like to see Government encouragement given in the shape of valuable prizes for the most efficient armed aeroplane or air-destroyer. That I think would be one of the most practical things that could be done at the moment.

ROYAL FLYING CORPS ORGANIZATION.

There is one other subject on which I should like to say a few words before I conclude. I venture to disagree with what the Lecturer says as to the future organization of the Flying Corps. Three years ago I presided at a lecture in this Institution, long before the Royal Flying Corps was established, and I then gave it as my opinion that the new aerial organization should be a combination of both the Navy and Army, and I was delighted to see that this was the view taken last year when the Royal Flying Corps was established. From all sides I hear that this combined organization has been an unmitigated success, and I firmly believe that this intimate association between the Navy and Army for flying purposes, will lead to a much better understanding of their relative duties and co-operation between the Services generally, and hence be of great benefit to the nation. Instead of making an independent flying service, such as recommended by Colonel Fullerton, I think the tendency should be so to draw the Navy and Army together, that they will in the future constitute one great service as far as interworking is concerned, and I am sure nothing could be more in accordance with the traditions of this Institution.

Ladies and gentlemen, I have to thank Colonel Fullerton on your behalf, for this most interesting lecture, and to express our appreciation of the great industry and research which he must have expended in its preparation. It will no doubt serve as a valuable record in the JOURNAL of this Institution.

SOUTH AFRICAN DEFENCE.

A RÉSUMÉ OF THE SOUTH AFRICA DEFENCE ACT OF 1912.

By LIEUTENANT R. H. BEADON, Army Service Corps.

WHATEVER may be the criticism that can be justly levelled against the Government of South Africa, it will generally be conceded that the passing of the Defence Bill in so short a time after union, is highly creditable to it. For, despite the loyal support lent to the Cabinet by the Opposition, it looked at one time as if it would be exceedingly difficult, if not impossible, to force the measure through the House of Assembly. The whole power of the back-veld was mistrustful of a measure that in their view tended to militarism, and compulsion in any form met with scant favour. The indefatigable work of Generals Botha and Smuts, however, succeeded in overcoming the prejudice, and the Act was enabled to take its place in the Statute Book.

It is not within the scope of this article to discuss ways and means, but merely to outline the scheme as passed into law. A few words defining the needs of the country may form as an introduction to a sketch of the Bill itself.

The problem before the Government was a two-fold one :—

(*a*) To preserve internal peace.
(*b*) To guard against external foes.

It would seem, at first sight, redundant to mention the former, but the large and ever-increasing number of natives within the Union makes the question a highly important one for Afrikanders. The white people, outnumbered by nearly seven to one, are compelled to take steps to render their position absolutely secure.

Regarding the second point, the issues are more complicated, for they involve the whole question of the relations of a self-governing dominion with the Mother Country, and the duties and responsibilities of the former should the latter be at war.

GENERAL OUTLINE OF THE DEFENCE ORGANIZATION.

It is proposed to outline as clearly as possible the proposed organization, as set down by the Act, and then to offer a few explanatory notes and comments. Criticism is scarcely fair until the actual working of the new state of affairs gives some facts to go upon. General Smuts himself freely invited discussion when the Bill was first introduced, and openly stated that he did not doubt but that it would be improved thereby.

The Governor-General is *ex-officio* head of the Force, and there is a " Council of Defence " appointed by him. This is to consist of a President and four members, and is compelled to

meet at least once in six months. It may be of interest to give their names:—

President: General Smuts, Minister of Finance and Defence.
Members: General S. C. Burger.
Colonel the Hon. C. P. Crewe, C.B.
General the Hon. C. R. de Wet.
Colonel Sir D. MacKenzie, C.B., K.C.M.G.

In addition there is a Headquarter Staff and there are also District Staffs. The former is presumably to be the channel of communication between the Minister of Defence and the various commanders and inspectors of the Defence Forces. The whole Union is to be divided into 13 Military Districts, an officer of field rank being appointed to each.

The Defence Force comprises the following forces:—

1. **The Permanent Force.**
2. **The Coast Garrison Force.**
3. **The Citizen Force.**
4. **The Royal Naval Volunteer Reserve.**
5. **Any Special Reserve established under the Act.**

To deal briefly with these in the above order.

(1) The Permanent Force.

The Permanent Force is to consist of:

(*a*) Persons engaged for continuous service in the organization and training of the Defence Force, and

(*b*) Persons charged in time of peace with the maintenance of order in the Union.

At present the Permanent Force will have five regiments of Mounted Rifles—approximately 2,500 strong, to be known as the South African Mounted Rifles. Each regiment will have a battery of artillery as a component part of it, and as many of its members as possible will be trained in field artillery duties in addition to their mounted rifle work.

The famous Corps of Cape Mounted Rifles forms the basis on which the Permanent Force is built, together with the police forces of the various Provinces of the Union. It will be responsible for police work during peace time, each regiment being allotted a district, and it will also provide instructors for the Citizen Force. Its members are at all tmes liable to be employed on active service against an enemy anywhere in South Africa within or outside the Union, or for the prevention or suppression of internal disorders within the Union.

The Act provides naturally for direct enlistment into the Force, but at present not very many men will be required, as the existing establishments that are to be incorporated will go far to bringing the five regiments to the proposed strength. As regards the officers it is laid down that in future—five years following upon the date of the establishment of a Military

College—the appointments to commissioned rank will as far as possible be given to graduates of that college.

Brigadier-General H. T. Lukin, C.M.G., D.S.O., late of the Cape Mounted Rifles, has been selected for the post of Inspector-General of the Permanent Force.

So much for the Regular portion of the Union Army.

(2) The Coast Garrison Force.

To quote the words of the Act:

"For the effective protection of the defended ports of the Union, there shall be established a Coast Garrison Force, which shall include a Corps to be designated the South African Garrison Artillery, and a Corps to be designated the South African Coast Defence Corps.

The Volunteer Corps of Cape Garrison Artillery shall be constituted the 1st Division of South African Garrison Artillery. The South African Coast Defence Corps shall consist of citizens trained specially to engineer, signalling, and telegraphy and harbour control duties."

The training of the above force is intended to be in conjunction with any Imperial troops forming the garrison of a defended port in the Union. Indeed, its *raison d'être* is to assist the latter in time of war or in the event of the withdrawal of the Imperial troops to take over the duties themselves. Special attention is drawn to the necessity of co-operation with the naval authorities.

The appointments to and conditions of service are similar to those hereafter described in dealing with:

(3) The Citizen Force.

As this forms the largest and most important part of the scheme, it will be dealt with at rather more length than the preceding. It is to consist of all men liable to render personal service in time of war who are not members of the Permanent Force, Coast Garrison Force, or Royal Naval Volunteer Reserve.

It will comprise three divisions:

(i.) *The Active Citizen Force.*
(ii.) *The Citizen Force Reserve.*
(iii.) *The National Reserve.*

(i.) THE ACTIVE CITIZEN FORCE.—The first of these is to consist of officers, N.C.O.'s and men, trained to special duties, who may be appointed; citizens between their seventeenth and twenty-fifth years who have been entered for and are undergoing peace training in the Force; and other citizens who are permitted to extend their service after their twenty-fifth year in units specially appointed for such extended service. Provided the men who have completed four years peace training in any unit of the Active Citizen Force before reaching their twenty-fifth year, may be permitted voluntarily to continue their service until they attain the age of 25.

The Force is to be organized by units of the various combatant arms and departmental services, and so far as practicable the organization of every unit will be arranged territorially, in such a way that units may be composed of those residing in the same districts, and that a group of units in the same or adjoining districts may constitute a field force properly equipped to take the field in time of war or for purposes of manœuvres.

A School of Aviation is provided for, and all who pass the prescribed course may be enrolled in the South African Aviation Corps, which comes under this category.

It is estimated that the strength of the Active Citizen Force will be from 20,000 to 25,000 men. This number will be selected from those registered under the Act, registration being compulsory between the ages of 17 and 21. If insufficient volunteers are obtained from the quota demanded in each district, the ballot will be applied; a system has been invented which ensures that those drawn are most easily able to serve. It has been freely stated that the ballot can be avoided by the payment of £1 a year. This is not so, but those who are not drawn by ballot do pay such a tax, and they must, in addition, join Class "B" of the Citizen Force, and serve at least four years in the Rifle Associations.

(ii.) THE CITIZEN FORCE RESERVE.—The second portion of the Citizen Force is the Citizen Force Reserve. It is divided into two classes:

Class "A" consists of men not past their forty-fifth year, who have undergone the prescribed training as members of the Active Citizen Force, and those who have been transferred to that Class from a Militia or Volunteer Corps. *Class "A"* will be organized, as far as possible, so that its members, unless engaged in the Field Reserve to the South African Mounted Rifles, will, until they are 45 years of age, be allotted as Reservists to their old unit of the Active Citizen Force.

Class "B" consists of men not over 45 years of age, who are serving, or who have served as members of a Rifle Association; and of any men who may have been transferred thereto from a Militia or Volunteer Corps. *Class "B"* will be organized so that its members, unless they are engaged for the Police Reserve to the South African Mounted Rifles, or for the Veteran Reserve, as described further on, will form territorial corps with sub-divisions, corresponding, as far as possible, with the arrangements of Rifle Associations in each district.

All members of the Citizen Force Reserve will, when called upon, be liable to present themselves for inspection once a year.

It is important to note that *Class "B"* includes a vast proportion of the male population of the country, because the

use of the rifle is compulsorily taught to all who do not join the Defence Forces, so that they will be in *Class "B"* until they are sixty years old, when they will then pass into

(iii.) THE NATIONAL RESERVE.—This Reserve forms the third portion of the Citizen Force, and merely comprises all those who, not being members of any other part of the Defence Forces, are liable to render personal service in time of war.

APPOINTMENT OF OFFICERS.—With regard to the officers of both the Coast Garrison and Citizen Forces, appointments are to be made as far as possible by promotion from the ranks. After five years from the commencement of the Act, every candidate for a commission has to fulfil the following conditions:—

(*a*) He shall satisfy the prescribed authority as to his capacity for leadership, military knowledge and experience, and educational attainments.

(*b*) He shall undergo courses of instruction in professional subjects and qualify in the same.

All who accept commissions have to engage to serve not less than six years from the date of their original appointment.

The appointment of those whose civil callings specially qualify them for any technical branch is provided for.

Promotion examinations for officers are laid down on very similar lines as those for the Regular Army.

It will be by no means easy to satisfy everybody with regard to the filling of the commissioned ranks at the outset. Plenty of material is available; indeed, the difficulty will be selection; but feeling between two sections ten years ago at war, naturally still runs high. But it is diminishing year by year, and the welding together of the two races will be materially assisted by their serving in arms together. So the future is not unhopeful.

Brigadier-General Beyers, one of the most able and resourceful of the younger Boer leaders in the war, has been selected as Commandant-General of the Citizen Force. Before taking up his duties he went for an extensive tour in Europe, with the object of seeing the Swiss Army system—upon which the Defence Force is avowedly modelled—in working. He also attended the British Army Manœuvres, and visited the chief arsenals of the United Kingdom.

4. The Royal Naval Volunteer Reserve.

The Royal Naval Volunteer Reserve is that body of volunteers constituting part of the Royal Naval Reserve, which, under the designation of the "South African Division of the Royal Naval Volunteer Reserve," is maintained at the expense of the Union Government. They may be placed at Imperial disposal for service in the Royal Navy in case of emergency, and they come under the regulations governing its discipline while under instruction, either on land or at sea, and while on actual service.

5. The Special Reserves.

The Special Reserves are somewhat complicated, but it is necessary to enumerate them in order to make clear the scope of the Defence Act.

1. A RESERVE OF OFFICERS, liable for service in time of war, is to be formed; but as yet no details regarding it are available.

2. A RESERVE FOR THE PERMANENT FORCES will be formed, consisting of:—

(*a*) *A Field Reserve* composed of:—

(i.) Those who have completed their term of engagement as members of the Permanent Force.

(ii.) Those who are enrolled in *Class "A"* of the Citizen Force Reserve.

Who are deemed suitable and engage thus to serve.

(*b*) *A Police Reserve*, consisting of citizens who are enrolled as members of *Class "B"* of the Citizen Force Reserve, and who are not less than 30 years of age, and who engage to serve therein.

3. THE COAST GARRISON FORCE RESERVE.—This consists of members of the Coast Garrison Force who have completed the prescribed period of training in that Force, and who are not over 45 years of age.

4. THE VETERAN RESERVE.—This consists of members of the National Reserve, or of *Class "B"* of the Citizen Force Reserve, other than members of that Force who have engaged for service in the Police Reserve, who have had war experience or an adequate military training, and who engage to serve in time of war in the Veteran Reserve.

THE PEACE TRAINING AND EDUCATION OF THE DEFENCE FORCE.

TRAINING.—The training of the Permanent Force need not be considered, for they will serve continually, and be always available for military training when not actually doing police duties.

The training of the Citizen Forces is a different matter. The Bill lays down that the course of training in the Active Citizen Force "shall extend over a period which shall be reckoned from the first day of July in the year of entry, to 30th June, in the fourth year from that date; and each training year shall be reckoned from July 1st in one year to June 30th in the following year."

The course of training in each year has not as yet been definitely fixed, but it is laid down that it shall not exceed

(*a*) Thirty days for the training year, during which a citizen is being trained as a recruit.

(*b*) Twenty-one days during any other training year, and will include one period of continuous training lasting not more than 22 days in the year, during which a man is being trained as a recruit; and not more than 15 days during any training year.

The following are to reckon as days during the non-continuous training:—

(*a*) A period of instruction lasting eight hours.
(*b*) Two periods of instruction each lasting four hours.
(*c*) Six periods of instruction each lasting one hour and a half.

The time occupied in proceeding to, and returning from the place of instruction, is not to be included.

If anyone, entered for training in the Active Citizen Force in any training years, evades without permission his full course, he is liable to be proceeded against.

Those entered for training in a mounted unit have to provide their own horses and saddlery, allowances being made for the same. The horses will be insured at the expense of the public while liable to military risks.

Those who volunteered for peace training, either in the Coast Garrison or Active Citizen Forces, have a choice of one of the units allotted to their district, while others do not.

It will have been observed how closely the principle of the scheme corresponds to that of Switzerland, though the periods of actual peace training are considerably shorter.

EDUCATION.—As regards military education, a South African Military College is to be maintained, and all candidates for commissions will in future be trained there. A class of some 50 selected officers—some English and some Dutch—have only re-recently completed the first course at Bloemfontein, where they were supervised by General Aston, late Chief of Staff to the Imperial troops in the country, who had been lent to the Union Government for that purpose. Much of the future of the scheme will depend on the first batch put through. They will be, so to speak, the apostles of the Defence Force, and have now gone to different parts of the country to take up appointments in connection with it.

Students at the South African Military College, other than officers of the Defence Forces, will be formed into a Military Corps, and their service in that corps will be reckoned towards service in the Defence Forces.

MILITARY INSTRUCTION OF THE POPULATION.

Having dealt with the education and training of the actual organized forces, the instruction that the bulk of the population receive should next be quoted.

RIFLE ASSOCIATIONS.—All liable to peace training, *i.e.*, all who might be compelled to serve in the Active Citizen Force, have to be enrolled as members of a Rifle Association, and for five years undergo a course of training in the care and use of the rifle. Rifles and accoutrements are provided at the public expense, and are liable to be inspected at various times. All others liable to render personal service in time of war may engage to serve in the Rifle Associations under certain conditions, receiving a free annual grant of ammunition. These Rifle Associations are to be territorially organized for the purpose of forming corps in time of war. Behind the Rifle Association comes the Cadet training.

CADET TRAINING.—A number of boys will have to undergo Cadet training in certain centres, where they will be instructed in physical exercises, military formations, rifle shooting, signalling, etc. Where there are no facilities for Cadet training, boys between the ages of 13 and 17 may be enrolled as Cadet members of Rifle Associations.

As regards the former class, if a boy has undergone the prescribed course of instruction for any one year, and has shown himself proficient, he will be reckoned as an efficient Cadet for that year, and if he is reckoned efficient for not less than three years, and his conduct has been satisfactory, he receives a certificate of efficiency. This entitles him to certain privileges if he joins the Active Citizen Force. As regards Cadet officers, schoolmasters, and others who are members of the Coast Garrison or Active Citizen Forces, and who hold commissioned rank, or are qualified for it in those forces, may be appointed as officers of Cadet Corps, and their service as such shall be reckoned as commissioned service in the Defence Force.

Colonel P. S. Beves, late Inspector of the Transvaal Volunteer Forces, has been appointed Commandant of Cadets.

A word now as to the vexed language question, which is dealt with as follows :—

> "All officers and non-commissioned officers of the Defence Forces shall be instructed in giving and receiving executive words of command in each of the official languages of the Union, and all citizens shall be trained and instructed in the official language which is best understood by them.
>
> "Whenever it is not practicable in any unit to carry out the instruction and training entirely in one of the official languages, then provision shall be made as far as possible for the instruction and training of the minority of the members of that unit in the language best understood by them."

The actual forces to be formed, and the training which they are to be given, have now been briefly sketched. Any desiring to pursue the subject more fully should study the Defence Act itself. There the administration, discipline, and various other points are provided for in more or less detail, though as yet

the scheme is, of course, in its infancy. Regulations are to be made, and one may expect a number of modifications before it actually gets working. The mainstay of the scheme is, of course, the Active Citizen Force, and this will not be filled for about four years—and *Classes* "*A*" and "*B*" not for nearly 30 years under normal conditions.

Then, as yet, the scheme is not properly understood by the mass of the people, and many prejudices exist. These are being largely overcome by the work of the officers in command of the districts, who are, at the time of writing, engaged in tours, to make known, by means of lectures and meetings, the duties of their people. The appointments made appear wise, the more exclusively Dutch parts of the country, such as portions of the Orange Free State, being under Dutch officers, and the more English portions, such as those of the Witwatersrand, under Englishmen.

The material is so excellent that it would appear justifiable to indulge in optimism. What nation in the world at the present time can claim so large a percentage of its citizens as having been trained in the hard school of war, and that in the country which they have now to defend?

One cannot do better than end with the words of a South African critic of the Bill:

"*Broadly speaking, it is safe to say that a good system has been devised. It is for the people of South Africa to see that efficiency is established; and experience has shown that the more efficient forces may be, the more popular do they become, and the greater the honour felt to become a member.*"

NOTE.—Since this article was written in November, 1912, various regulations and instructions (in English and Dutch) concerning the Defence Act have been received from South Africa. Extracts from some of these are given below as Appendices.—Ed.

APPENDIX I.: REGISTRATION.

REGULATIONS FOR THE REGISTRATION AND VOLUNTARY ENTRY OF CITIZENS FOR PEACE TRAINING.

1. *Registration by 15th January*, 1913.—Any citizen who, during the year 1913, will attain an age between 17 years and 21 years (both years inclusive) must appear personally between the 2nd and the 15th day of

January, 1913, at a magistrate's office, police station, or police post, or before a field cornet, except in the Province of Natal, and fill in a registration form as set forth in Appendix A.

2. *Acknowledgment of Registration.*—The official or police officer before whom the registration form is filled in shall complete the same and hand the citizen a form of acknowledgment as set forth in Appendix B, which shall serve as a certificate of registration for the purpose of production under sub-section (5) of section 53 of the Act, until the citizen has been furnished with a certificate of registration in the form set forth in Appendix C.

3. *Registration during January prevented by Illness or Physical Disability.*—If a citizen, by reason of bona-fide illness, or physical disability, is unable so to appear and register himself, and transmits to such office, station, post, or field cornet, as is mentioned in paragraph 1 of these regulations, not later than the 15th day of January, 1913, a letter giving his full name and postal address, the year of his birth, and a true statement as to his illness or physical disability, he may be permitted to register himself in such other manner as the Registering Officer can arrange, and upon such registration shall be deemed to have fulfilled his liability under the Act to register himself during the month of January.

4. *Registration after Due Date.*—(*i*) A citizen who, on account of absence from the Union or for any other valid reason, is unable to register himself during the month of January shall appear personally before a magistrate within 30 days after the date of his return to the Union, or after the date upon which any other cause of his not having been able to register himself during the month of January has ceased to exist, and shall satisfy the magistrate that owing to such absence, or for other valid reason, he was unable to register himself during that month.

(*ii*) If the magistrate, upon sufficient proof, is satisfied as to such absence or as to the validity of such reason, and as to the citizen having appeared before him within 30 days after the date aforesaid, he shall require the citizen to make an affidavit as to the circumstances of the failure to register during the month of January, and shall require the citizen to complete the registration form as set forth in Appendix A. The magistrate shall then transmit the affidavit and registration form to the Registering Officer.

(*iii*) If the magistrate be not so satisfied, he shall require the citizen to complete the registration form given in Appendix A, and in transmitting it to the Registering Officer he shall notify the said officer that the citizen has failed to satisfy him as aforesaid.

5. *Registration after Conviction for Failure to Register.*—Upon conviction of a citizen for failure to register himself duly in accordance with the provisions of the Act and these regulations, the Court before which the citizen has been convicted shall make an order requiring him to register himself forthwith before a magistrate.

6. *Registration of Persons who become Citizens after January.*—Any person who, by reason of his or his parent's naturalization, or by reason of his coming to reside permanently within the Union, or under any other circumstances, becomes a citizen after the month of January in his 17th year and before the month of May in his 21st year, shall register himself in accordance with the provisions of paragraph 4 of these regulations, and the said provision shall, *mutatis mutandis*, apply to the registration of such citizen.

7. *Registering Officers and other Persons to assist in Registration.*

(*i*) The District Staff Officer of every military district and sub-district shall be the Registering Officer for that district or sub-district.

(*ii*) The following persons are authorized to give such assistance as may be required in carrying out the registration of citizens under these regulations:—

(*a*) Magistrates and assistant magistrates, field cornets, and when thereto required by the Minister justices of the peace, members of magisterial staffs.

(*b*) All ranks of the instructional and administrative staff of the Union Defence Forces.

(*c*) All ranks of any police force by law duly constituted.

8. *Voluntary Entry for Peace Training.*—A citizen who in any calendar year will attain any age between 17 years and 21 years (both years inclusive) may apply to be entered for peace training in that year by appearing personally before, or lodging written application with, the Registering Officer of his military district, between the 2nd day of January and the 15th day of June (both days inclusive) of that year.

Where a citizen desires to enter voluntarily for peace training in the same year as he registers himself under the Act, and states so in his form of registration, it will not be necessary for him to make any further application.

NOTES ON THE STATUS OF A "CITIZEN" AS A BRITISH SUBJECT UNDER THE SOUTH AFRICA DEFENCE ACT, 1912.

In section 124, "Citizen" is defined as meaning:—

"any male British subject in the Union other than a British subject belonging to His Majesty's Naval Forces or Naval Reserve Forces, or to His Majesty's Regular, Reserve, or Auxiliary Military Forces, or in the service of His Majesty's Government,[1] or on the personal staff of the Governor-General of the Union."

Subject to the remarks made later as to a person divesting himself of his status as a British subject, a person is a British subject in the Union

(*a*) By having been born a British subject:

(*b*) By the annexation of the South African Republic and the Republic of the Orange Free State to the British Empire, and by showing his acceptance of the change of Government resulting therefrom in remaining within the territories of those Republics under the new Government:

(*c*) By naturalization under Act of Union Parliament No. 4 of 1910, or the prior provincial naturalization laws repealed by that Act:

(*d*) By naturalization under the Imperial Naturalization Act.

The following points should be noted under each of these heads:—

(a) *Persons who are born British subjects.*—All civilized nations claim as their subjects:—

(i) Persons who are born in their territories (unless they were born children of alien enemies when those territories were in military occupation of those alien enemies);

(ii) Persons whose parents are their subjects, wherever they may be born.

These are simple rules enough, taken by themselves, and no difficulty occurs except when they both operate, as for example where children of

[1] In other words anyone in the Imperial Navy, Military, or Civil Service paid by the Government of the United Kingdom.

parents who are German subjects are born within the Union of South Africa, or again where children of South African British subjects are born in German South-West Africa. In both these cases, these children have both British and German nationality. Dual nationality is dealt with later in these notes. The other simple rules which determine nationality are:—

(i) The wife takes the nationality of her husband, whatever that nationality may be for the time being;

(ii) A spinster or widow can change her nationality when or after she becomes 21;

(iii) Children under 21 take the nationality of their parents, and cannot alter their status voluntarily under the age of 21. From the age of 21 no change of nationality made by their parents can affect the children;

(iv) Children under 21 who are not residing with their parents when they become naturalized, but are in a foreign country, away from their parents, do not change their nationality on the naturalization of their parents, unless, before they are 21, they come and take up residence with their parents in the country of naturalization.

(b) *"By annexation."*—Every burgher of the late Republics became a British subject when, on the termination of hostilities, and the consequent acceptance by the Governments of those Republics of the fact of annexation, he settled in the territories which on annexation had become part of the British dominions. No other specific act on his part, such as an oath of allegiance or formal declaration, was necessary to render him a British subject.

(c) *"By naturalization in the Union under South African Naturalization Acts."*—Every civilized nation has laws providing for persons of other nationalities taking upon themselves its own nationality—this act is termed "naturalization"—but the laws of various nations differ as regards the extent to which a person can divest himself of his original or acquired nationality. As a general rule, it may be stated that every nation claims the right to subject any person who was originally of or has acquired its nationality, to all the obligations its laws lay upon persons of its nationality within its own territories. Thus a German subject by birth who has become a naturalized British subject, cannot claim exemption from compulsory military service if he returns to German territory. In practice, moreover, the British Empire does not extend its protection to naturalized British subjects when they return to, or travel in, the country of their origin.

(d) *"By naturalization under the Imperial Naturalization Act, 1870."*—The provisions of Section 9 of the Union Naturalization Act (No. 4 of 1910) make this point quite clear. It should be observed, however, that naturalization under any laws of the other self-governing dominions (viz., Canada, Australia, New Zealand, and Newfoundland) is not recognized in the Union. The position briefly is that naturalization under the Imperial Act runs throughout the whole British Empire, but the naturalization law of a self-governing dominion has effect only within its own territories.

Dual Nationality.—Under the Imperial Naturalization Act, a person who has dual nationality, that is, who was—

(i) either born in a foreign country of British parents; or

(ii) born in British dominions of foreign parents,

may, on or after reaching the age of 21, divest himself of his British nationality by making a declaration to that effect in due form. Until

he is 21, he has no power to do so. A person naturalized under that Act may also divest himself of his status of British subject.

In South Africa there certainly are a considerable number of young men who thus have dual nationality. The far greater majority of cases of dual nationality will be found to be those of the 2nd class mentioned above. District Staff Officers may have to deal with such cases. While no doubt these persons with dual nationality are citizens as defined by the South Africa Defence Act, the Minister wishes District Staff Officers, in dealing with such cases, to be guided by these notes and the following instructions:—

(1) A note in red ink should be made of any case of dual nationality on the certificate of registration in the original and the duplicate of the record, thus,

"*Has also Italian nationality from parents.*"

or

"*Has also German nationality from place of birth.*"

(2) Cases of persons who claim exemption from registration or service under the Defence Act owing to their having dual nationality should be referred at once to the Under-Secretary for Defence, with full particulars of each case, and no attempt should be made to enforce registration or service until the Minister's instructions on the case are received.

In the annexure are set out a few examples which District Staff Officers will do well to study carefully, and understand thoroughly, so that they may be familiar with the application of the rules given above when having to deal with, and elicit information, on complicated cases, involving the determination of any individual's nationality.

H. R. M. BOURNE,
Under-Secretary for Defence.

Department of Defence,
Pretoria, 8th November, 1912.

EXAMPLE.

In 1894 a German subject came to reside in the Transvaal, and brought with him a son, who was born in Germany during 1890.

In 1899 the father became a burgher, but before doing so, he sent his son to school in Germany. After the war he remained in the Transvaal, and thus accepted British nationality. The son did not return to South Africa till 1912, when he joined his father in business at Johannesburg.

Question.—What is the present nationality of the father and of the son?

Answer.—The father is a British subject by annexation. The son is a German subject by place of birth and by parentage.

Question.—Suppose the son returns to Johannesburg in 1910, is his nationality affected?

Answer.—Yes; he comes to reside with his father while a minor, and therefore takes the nationality which his father acquired by annexation while the son was a minor. The son has, however, dual nationality because of his place of birth.

Question.—Suppose the son had been born in South Africa in 1890, either in

(*a*) the Transvaal; or
(*b*) Natal,

how would this affect the position?

Answer.—In both cases he would be a British subject if he returned to South Africa in 1910, but if he did not return till 1912, he would

in case (*a*) be a German subject,
in case (*b*) be of dual nationality.

Question.—Explain the reasons for the answers to the last question.

Answer.—(*a*) If the son was born in the Transvaal in 1890, he would, but for the annexation, have eventually become a Transvaal burgher by place of birth, and would be a German subject by parentage. If he left South Africa in 1899, and returned in 1910 he acquires the nationality of his father, which was that of a British subject by annexation. If, however, he did not return till 1912, the fact of his father having become a Transvaal burgher and then a British subject by annexation does not affect him. He cannot claim British nationality by having been born in the Transvaal when it was not British territory.

(*b*) He is a British subject by place of birth, and if he returns to British South Africa in 1910, acquires the nationality of his father which became that of a British subject by annexation. If, however, he does not return till 1912, he is a British subject by place of birth, and a German subject by parentage, seeing that he was in foreign territory while a minor, and while his father acquired another nationality by becoming a burgher of the Transvaal, and then by annexation. If, of course, he had on attaining the age of 21 in 1911, under the Imperial Naturalization Act divested himself of his status of British subject, the question of dual nationality would fall to the ground, and he would be a German subject only.

INSTRUCTIONS TO OFFICIALS, FIELD CORNETS AND POLICE OFFICERS ASSISTING WITH THE REGISTRATION OF CITIZENS UNDER SECTION 53 OF THE SOUTH AFRICA DEFENCE ACT, 1912.

Instructions on the above subject were circulated to all concerned; they laid down that registration would commence on January 2nd, 1913. An acknowledgment receipt is given to each citizen on registration; for every such registration the field cornet receives a remuneration of one shilling (maximum payment £10). The registration forms, as filled in, are forwarded daily to the District Staff Officer, who acts as Registering Officer and by whom the certificates of registration are made out and posted to citizens. Points, upon which further information is desired, will be referred to the resident magistrate of the District. After 15th January, 1913, outlying districts are to be visited by police officers in order to assist those to comply with the law who reside long distances from a field cornet.

These instructions are printed in English and Dutch, and are also distributed in the form of posters in both languages.

SOUTH AFRICA DEFENCE ACT, 1912.

FORM OF REGISTRATION—[under Section 58 (2)].

Registration No..... Military District.....

Magisterial District.....

NOTE.—The above particulars will be filled in by the Registering Officer.

GIVE BELOW IN CLEAR DISTINCT WRITING IN INK:—

1. Your **full** name .....

2. (*a*) The year of your birth (in figures)..... (*b*) Your age (in figures).....

3. The place where you were born .....

Before filling in this address, read No. 5 (a).

4. (*a*) The full postal address of your *permanent* place of residence (P.O. Box number only will *not* suffice).
   - Number of house and name of street .....
   - or
   - Name and, if possible, registered number of Farm .....
   - Post Office .....
   - Magisterial District .....
   - Province .....

You need not answer these two questions if your place of residence given under 4 (*a*) is a town.

(*b*) How far is it from the nearest Post Office? .....

(*c*) What is the nearest Railway Station, and how far is it away? .....

5. (*a*) If you are not at present at your place of residence given under 4 (*a*), give the name and address of the person with whom you are living.
   - Name .....
   - Number of house and name of street .....
   - or
   - Name and, if possible, registered number of Farm .....
   - Post Office .....
   - Magisterial District.....
   - Province .....

(*b*) If you are at a school or college, give its name and address .....

6. (*a*) Who is your nearest relation or guardian?
   - Relationship .....
   - Name .....

(*b*) What is his (or her) address?
   - Number of house and name of street .....
   - or
   - Name and, if possible, registered number of Farm .....
   - Post Office .....
   - Magisterial District.....
   - Province .....
   - Country (if outside the Union) .....

7. (*a*) What is your employment? .....

(*b*) Give name and address of your employer.....

Before answering these two questions read carefully the note at the end of form.

8. (*a*) Do you wish to enter voluntarily this year? .....

(*b*) If so, do you prefer to bring a horse, saddle, and bridle, and be trained as a mounted man? If you cannot do so you will be trained for dismounted duties. .....

9. Sign your name to the following declaration:—

I, the undersigned, hereby solemnly declare that in this statement I have given the full and correct particulars required of me according to law

Date..... (Signature).....

Place .....

Acknowledgment receipt No. ...issued by me.

(Signature and designation of official taking registration.).....

NOTE THIS CAREFULLY.

You may voluntarily enter for four annual courses of training in the Active Citizen Force, which will begin during the latter half of this year (1913), and you will then be doing your full duty as a citizen of the Union. You will be paid for the days when you are training in camp.

IF YOU BECOME 21 YEARS OF AGE THIS YEAR (1913) and do *not* enter voluntarily for training in the Active Citizen Force, then either

(*a*) you will be drawn by ballot, and compelled to undergo that training; or

(*b*) if you are not drawn by ballot, then you will be compelled to undergo four annual courses of training in a rifle association.

APPENDIX II.: TRAINING.

Regulations for Course of Peace Training, Active Citizen Force.

1. The course of peace training in the Active Citizen Force shall be as follows:—

FIRST YEAR'S (RECRUIT) TRAINING.

Arm.	Training.		Total (Maximum 30 days.)
	Continuous (Max. 22 days.)	Non-continuous.[1]	
	days.	days.	
Field Artillery	15	8	23
Engineers	12	10	22
Mounted Troops	22	3	25
Infantry...	12	10	22
Departmental Services ...	12	10	22

[1] To include musketry.

ANNUAL TRAINING FOR OTHER THAN RECRUITS.

	Training.			Total (Max. 21 days.)
	Continuous (Max. 15 days.)	Non-continuous.		
		Training.	Musketry.	
	days.			
Field Artillery	15	5	1	21
Engineers	10	5	3	18
Mounted Troops	15	—	3	18
Infantry	10	5	3	18
Departmental Services ...	10	5	1	16

2. The equivalents referred to in section *sixty-four* (3) of the Act shall be applied as may be decided from time to time as training necessitates, and the requirements of each arm in the various military districts suggest.

3. (*a*) The periods of continuous training laid down in paragraph 1 shall not be broken except in the case of field artillery, the continuous training of which may be broken into not more than two periods.

(*b*) Members of Militia and Volunteer Corps who have transferred to the Active Citizen Force under sections *forty-six* (1) (*a*) and *forty-eight* (*a*) of the Act, and who have been returned as efficient for not less than two years during their Militia or Volunteer service, may be granted leave of absence from continuous training by their commanding officer for a maximum number of days, to be fixed by the Commandant-General, Citizen Force, in the case of each unit.

4. The days of non-continuous training laid down for recruits represent the maximum number, and any recruit who, during his course of instruction, may be found by a Regimental Board consisting of the Regimental Commander, an officer not below the rank of captain, and the adjutant, to be fit for the ranks as a trained man, shall cease to be trained as a recruit and shall continue his training as a trained man.

5. A recruit who, before performing the full number of recruit drills is classed in terms of regulation 4 as a trained man, shall complete the rest of his first year's training as a trained man, but shall not fire the trained man's course of musketry till his second year of service.

6. Continuous training shall mean field training for an unbroken period of days of twenty-four hours each whilst in camp or bivouac, and is referred to hereinafter as field training.

7. Field training shall begin from a time and date to be specified in orders, and shall conclude on a date and at a time similarly specified.

8. The days appointed for non-continuous training during the training year shall be fixed and notified at the beginning of the year, and the notice shall set forth the number of hours training to be performed on any day so appointed.

Any alteration to these dates and hours shall be notified not less than 30 days beforehand.

9. To provide for the complete training of citizens who are unavoidably prevented from attending for any period of non-continuous training, and whose absence from such training is duly authorized by the commanding officer of their unit, casualty drills shall be arranged for each unit in such numbers and on such occasions as may be necessary in view of the number of casualties and the number of drills which they have to attend to complete the attendances demanded from them.

10. A citizen who absents himself from non-continuous training without being duly authorized by the commanding officer of his unit, as provided in the last preceding regulation, shall be charged with an offence under section *one hundred and nine* of the Act.

APPENDIX III.: PAY AND ALLOWANCES.—ACTIVE CITIZEN FORCE.

REGULATIONS FOR PAY AND ALLOWANCES, ACTIVE CITIZEN FORCE.

1. The daily rates of pay for members of the Active Citizen Force, when they are engaged on continuous training, shall be as follows:—

	s.	d.
Lieut.-Colonel	20	0
Major	15	0
Captain	12	6
Lieutenant	10	0
Paymasters, quartermasters, medical officers, veterinary officers	The pay of the rank allotted to them.	
Warrant officers	6	0
Staff-sergeants	5	0
Sergeants	4	6
Corporals	3	6
Bombardiers and lance-corporals	3	3
Gunners, privates, trumpeters, and buglers ...	3	0

2. A citizen who

(*a*) having completed four years' peace training in the Active Citizen Force, or

(*b*) having been transferred to the Active Citizen Force from a Militia or Volunteer Corps, with not less than five years' "efficient" service in that corps,

is engaged to continue his service in that Force, as a non commissioned officer in or above the rank of sergeant, may receive an allowance at the following rate:—

	s.	d.	
During continuous training	1	0	a day
For every day's attendance at non-continuous training	3	0	,,
For every attendance for training for a period of four hours	2	0	,,
For every attendance for training for a period of an hour and a half	1	0	,,

Payment of the allowance for continuous training shall be made at the conclusion of the said training, and at the end of every quarter in arrear for other attendances.

3. During days of continuous training, all ranks of the Active Citizen Force may receive rations at the public expense, or an allowance in lieu of rations not exceeding 1s. 6d. for each such period.

For a period of one day's training lasting eight hours all ranks of the Active Citizen Force may receive rations at the public expense, or an allowance in lieu of rations not exceeding 1s. for each such period.

4. Forage may be supplied at the public expense for every authorized horse used during days of continuous training, or a cash allowance not exceeding 1s. 6d. a day may be paid in lieu of supply. For a period of one day's training lasting eight hours, forage may be supplied at the public expense, or an allowance not exceeding 1s. a day may be paid in lieu of supply.

5. Rail transport at Government expense may be provided (in accordance with instructions issued to district staff officers) to members of the Active Citizen Force proceeding to or returning from places appointed for their training and exercise. Rations, or the allowance in lieu, will be given to members while so travelling if the journey either way necessarily occupies eight hours or more.

6. The following allowances may be paid to qualified signallers and machine-gunners of the Active Citizen Force on the establishment of a unit:—

	s.	d.	
Signallers	2	0	a day
Machine-gunners	1	0	,,

for every day of continuous training, and for each attendance of a period of not less than eight hours.

Payment of these allowances shall be made as in the case of the senior non-commissioned officers' allowance as laid down in paragraph 2 of these regulations.

7. The following allowances shall be paid to members of the Active Citizen Force in respect of attendance on the occasions indicated:—

Attachment to Regular Forces (Imperial or South African);

Attendance at special courses or schools of instruction:

	s.	d.	
Officers	12	6	per diem.
Other ranks	7	6	,,

The grant of the above allowances shall be subject to the following conditions :—

(*a*) That a proficiency certificate is awarded at the conclusion of the period or course of instruction; or

(*b*) If no proficiency certificate is issuable, a certificate is issued by the officer in charge of the course that the member attending has been regular and attentive under instruction, and has made satisfactory progress in the subjects taught;

(*c*) In special cases, where the above conditions are not fulfilled, the Minister may, upon the recommendation of the Commandant-General, authorize the grant of the allowance.

8. The allowances laid down in paragraph 7 may be applied whenever the special attendance of individual members is required on occasions other than those prescribed for military training, in circumstances involving personal expense, for which no specific allowance is laid down.

9. Officers and other ranks of the Active Citizen Force who are required or permitted to undertake any attendance or duty for which an allowance is admissible under the two foregoing paragraphs may, while travelling to and from the place of attendance or duty, be granted travelling and subsistence allowance at the rates laid down for corresponding ranks of the Permanent Force.

APPENDIX IV.

EMBODIMENT OF MILITIA AND VOLUNTEER CORPS IN ACTIVE CITIZEN FORCE.

MINIMUM QUOTAS TO BE FURNISHED BY CORPS UNDER SECTION FORTY-SIX (1) OF THE S.A. DEFENCE ACT, 1912, TO BE EMBODIED AND TRAINED AS PART OF THE ACTIVE CITIZEN FORCE ON AND AFTER JULY 1ST, 1913.

1st Column (Name of Unit).	2nd Column [Clauses (*a*) and (*b*)].	3rd Column [Clause (*a*)].	4th Column [Clause (*b*)].
Cape Province—			
Cape Field Artillery (1)	–	34	13
Cape Light Horse	312	150	94
D.E.O.V. Rifles (2)...	256	111	77
P.A.V. Guard (2), (3)	151	50	45
Queenstown V.R. (4)	118	38	35
First City Volunteers (4)	138	44	42
Kaffrarian Rifles	256	86	77
Kimberley Regiment	256	65	77
D.C.S.O. Capetown Highlanders ...	256	81	77
Uitenhage Volunteer Rifles (3)	105	35	32
P.W.O.R. Cape Peninsula Rifles ...	256	76	77
Cape Medical Corps (5), (6)	40	12 A Co.	12
	40	12 B Co.	12

1st Column (Name of Unit).	2nd Column [Clauses (*a*) and (*b*)].	3rd Column [Clause (*a*)].	4th Column [Clause (*b*)].
Natal Province—			
Natal Carabineers	312	125	94
Natal Mounted Rifles (7)	85	61	24
Umvoti Mounted Rifles (7)	80	56	24
Border Mounted Rifles (7)	73	49	24
Zululand Mounted Rifles (7)	74	50	24
"C" Battery, Natal Field Artillery (1)	45	19	13
Durban Light Infantry	256	100	77
Natal Medical Corps (6)	80	24	24
Natal Telegraph Corps (6)	—	18	4
Transvaal Province—			
Transvaal Horse Artillery (1)	45	22	13
Imperial Light Horse	312	125	94
Transvaal Scottish...	256	100	77
Witwatersrand Rifles	256	125	77
Transvaal Cycle and Motor Corps (8) ...	256	100	77
Transvaal Signalling and F.T. Co. (6)...	—	24	8
Transvaal Medical Corps (6)	126	50	37

Notes.

1. These units to be designated the 6th, 7th, and 8th Citizen Batteries respectively, retaining the old regimental title in brackets after that designation.

2. The term "volunteer" will be omitted from these corps.

3. Uitenhage Volunteer Rifles to become part of P.A. Guard, retaining as a company of that battalion the title "Uitenhage" in brackets after the alphabet letter of the company.

4. Q.R. Volunteers and 1st City Volunteers to become one infantry battalion to be styled "The City Rifles," two companies of which will retain the title "Queenstown" and two companies the title "First City" in brackets after the alphabet letter of the company.

5. Two companies of 50. "A" Company, Kingwilliamstown, "B" Company, Capetown.

6. The designations of these corps are subject to alteration on or after embodiment.

7. Each of these regimental units on embodiment to become a squadron unit of a regiment to be styled "The Natal Mounted Rifles." B, C, and D squadrons to retain their old regimental titles placed in brackets after the alphabet letter of the squadron.

8. To be allotted a different designation on embodiment in the Active Citizen Force; to be determined later.

THE YEAR 1912 IN FOREIGN ARMIES.

GERMANY.

MILITARY ESTIMATES.

(Sums converted at the rate of 20 marks to the pound sterling).

The following have been the estimates for military expenditure during the last two years. The amounts actually expended are not published until three years later.

	1912.	1911.	Increase or Decrease.
ORDINARY ESTIMATES.	£	£	£
Recurring Expenditure.			
Army Administration ...	34,420,665	35,728,898	– 1,308,233
Imperial Military Tribunals	26,565	27,444	– 879
General Pension Fund (Army)	6,376,368	6,959,212	– 582,844
Non-recurring Expenditure.			
Army Administration ...	7,143,095	3,875,263	+ 3,267,832
Imperial Military Tribunals	175	—	+ 175
EXTRAORDINARY ESTIMATES.			
Army Administration ...	838,215	1,184,470	– 346,255
Totals ...	**48,805,083**	47,775,287	+ 1,029,796

NOTE.—The expenditure on the Protectorate Troops is dealt with in separate estimates, and is not included in the preceding table.

ORGANIZATION.

COMPOSITION OF ARMY.—The German Army consists of:—25 army corps, 50 divisions and 51 cavalry brigades. The normal composition of formations and units is:—Two divisions in an army corps, two* brigades in a division, two* regiments in a brigade, three* battalions in a regiment, and four† companies in a battalion.

* Six divisions have three brigades; five infantry brigades have three regiments; and 22 regiments have two battalions each.

† One hundred and thirteen battalions have one machine-gun company each in addition to the four ordinary companies. The number of machine gun companies is to be increased to 214 by March 31st, 1913.

PEACE ESTABLISHMENT.—The peace establishment is approximately as follows:—

Infantry, 428,351;
Cavalry, 74,460;
Artillery: Men, 103,307, field guns, 4,350 (*a*);
Other arms and departments, 49,804;
Total, 655,922 (*b*).

(*a*) This includes 3,330 guns belonging to the field artillery and 1,020 to the foot artillery.

It is rumoured that three more field batteries in each army corps are shortly to be armed with howitzers instead of guns, thus giving a field howitzer *Abteilung** to every division.

(*b*) This represents an average establishment for which pay can be drawn for the whole year and not a maximum establishment. In order to obtain a correct total of the peace strength when it is at its maximum in October, about 13,500 one-year volunteers, 2,800 officials and 21,000 extra recruits called up to allow for wastage must be added. The *total peace strength* may, therefore, be assessed at 693,222 all ranks.

ANALYSIS OF PEACE STRENGTH.—The following is an analysis of the peace strength by units on 1st October, 1912:—

Infantry battalions	647	(*c*)
Machine-Gun batteries	13	(*d*)
Cavalry squadrons	510	
Horse and Field Artillery batteries	625	(*e*)
Foot Artillery battalions	48	(*e*)
Pioneer battalions	32	(*f*)
Communication Troops —		
Railway battalions	7	(*g*)
Telegraph ,,	6	(*h*)
Air ,,	4	(*i*)
Mechanical transport battalion	1	(*k*)
Train battalions	25	(*l*)

Remarks.

(*c*) One hundred and thirteen battalions have one machine-gun company each (see above, Section I., Note †).

(*d*) To be reduced subsequently to 11.

(*e*) Including nine field batteries at the Field Artillery, and two battalions with draught horse section at the Foot Artillery School of Gunnery.

(*f*) In addition to these there are one Prussian traffic section and one searchlight section.

(*g*) In addition to these there are one Prussian traffic section and one Saxon and one Württemberg detachment of the traffic section.

(*h*) The Prussian telegraph troops consist of five battalions divided into two "Inspections" under the Inspector of Field Telegraphy in Berlin. Each battalion consists of three companies, one wireless company and one draught horse section. The 3rd Company of No. 1 Telegraph Battalion and a portion of a wireless company are furnished by Saxony, and there

* See footnote on page 367.

is a Württemberg detachment in the 2nd Company of this battalion, to which battalion the Cavalry Telegraph School is attached.

(*i*) Prussia has three air battalions, one draught horse section and one flying troop; Saxony and Württemberg one air detachment each; and Bavaria one aircraft and mechanical transport battalion.

See also below Note (*k*) second paragraph.

(*k*) The mechanical transport troops, which are under the Inspector of the Military Aircraft and Mechanical Transport Service, are organized in a battalion consisting of three companies, included in which are Saxon and Württemberg detachments.

The Bavarian mechanical transport troops are combined with the Bavarian aircraft troops to form an Aircraft and Mechanical Transport Battalion.

(*l*) The Train has been re-organized during the year under review.

HIGHER ORGANIZATION AND CONDITIONS OF SERVICE.

THE NEW ARMY BILL.—A new Army Bill for supplementing the Peace Strength Law of March, 1911, became law on the 14th June, 1912. The enactments of this measure consist of:—

(1) An alteration in the Imperial Military Law.
(2) A supplement to the Peace Strength Law of March, 1911, and to the Regulations for Pay.

(1) The wording of the Imperial Military Law is amended so as to lay down that the German Army in peace time is to consist of 25 army corps (instead of 23 as hitherto). Of these army corps, Bavaria furnishes three, Saxony two, Württemberg one, and Prussia and the Prussian Military States 19.

The Empire is to be divided into 24 army corps districts (instead of 22 as hitherto).

This law was to come into force on October 1st, 1912.

(2) By the Peace Strength Law of March, 1911, it was decreed that from the 1st April, 1911, the establishment of the Army was to be increased (not counting officers, non-commissioned officers over the rank of corporal and one-year volunteers) so as to reach a total of 515,321 by 1915, and to remain at that figure until the expiration of the term of five years at the end of March, 1916. This total is now altered to 544,211, which involves an increase of 28,890.

The contributions of men by the various States are, therefore, raised to the following figures:—

Prussia and the Prussian Military States	420,039
Bavaria	60,351
Saxony	41,625
Württemberg	21,296

The numbers of units are to be increased as shown below:—

Infantry	from 634 to 651	battalions.
Cavalry	,, 510 ,, 516	squadrons.
Field Artillery	,, 592 ,, 633	batteries.
Pioneers	,, 29 ,, 33	battalions.
Communication Troops ...	,, 17 ,, 18	battalions.
Train	,, 23 ,, 25	battalions.

THE EXPLANATORY NOTE.—The explanatory note of the Bill laid down that the Peace Strength Law of March, 1911, must be brought into effect more rapidly than appeared to be necessary a year ago. The more important provisions of this Law were therefore to be introduced by the autumn of 1912.

The military situation, it was stated, further demanded an improved state of preparedness for war by calling up in larger numbers the men available for service and by a completion of the organization of the Army. On the one hand, the number of men trained must be equal to the demands of possible future hostilities, and on the other hand, the transition from a state of peace to that of war must be facilitated.

The necessary measures, the explanatory note continued, involved the creation of two new army corps, and thus certain alterations would have to be made in the existing Imperial Military Law.

By supplementing the regulations for pay, an increased elasticity was aimed at in the filling of appointments for officers, which was stated to be indispensable and of special importance for the development of the Military Communication Service.

The calculation as to what extent the population would in future be called on to supply the augmented peace strength was based on the results of the census of 1910. The following table shows a comparison between the numbers and percentages to be called up in accordance with the Law of March, 1911, and the present proposals:—

State.	Census of 1905.	Peace strength according to Law of 27-3-11.	Per-centage.	Census of 1910.	Peace strength according to new proposals.	Per-centage.
Prussia, etc. ..	47,306,126	399,026	0·843499	50,794,467	420,939	0·828710
Bavaria ...	6,524,372	57,133	0·875685	6,887,291	60,381	0·876701
Saxony... ...	4,508,601	39,911	0·885219	4,806,661	41,625	0·865985
Württemberg	2,302,179	20,231	0·878776	2,437,574	21,296	0·873655
German Empire	60,641,278	516,301	0·851401	64,925,993	544,241	0·833165

It will be observed that the proportion remains very much the same. The slightly increased burden, it was stated, on Bavaria, Saxony and Württemberg, as compared with that on

Prussia, would be scarcely perceptible, and would, moreover, be equalized by additional demands on Prussia for the recruits for the Navy.

Proposed Changes in 1912-1915.

The following is a synopsis of the changes it is proposed to carry out in the Army during the years 1912-1915 :—

PRUSSIA.

COMMAND STAFF.—One army inspection, one medical inspection, two army corps staffs, two divisional staffs, 15 *Landwehr* inspections, two field artillery brigade staffs, one pioneer inspection.

INFANTRY.—Eleven battalions, 80 machine-gun companies, increase in the establishment of the rank and file in 96 battalions.

CAVALRY.—One regimental staff, five squadrons.

FIELD ARTILLERY.—Four regimental staffs, eight *Abteilung** staffs, 24 batteries, conversion of nine horse artillery *Abteilungen** of six guns each into *Abteilungen** of three batteries of four guns each. Increase of establishment of men and horses in 54 batteries.

FOOT ARTILLERY.—One battery.

PIONEERS.—One commander of the pioneers of one army corps, three battalions, 20 searchlight sections.

COMMUNICATION TROOPS.—One wireless telegraph company, one air troop, increase of establishment of officers and men in the Motor Traction Battalion.

TRAIN.—Two battalions (each of five companies), two train depôts.

Remarks, ADDITIONAL.—Two half bearer detachments, two horse inspection commissaries, increase of establishment in men and horses at the Military Riding School, two remount depôts, increase of number of artillery depôts and reinforcements of the ordnance and artificer personnel, increase of administrative personnel, etc.

BAVARIA.

COMMAND STAFF, ETC.—Four *Landwehr* Inspections.

INFANTRY.—Twelve machine-gun companies, increase in the establishment of the rank and file in 20 battalions.

CAVALRY.—One squadron.

FIELD ARTILLERY.—Six batteries, conversion of the *Abteilung* N.A. of two batteries of six guns each into one of three batteries of four guns each. Increase of establishment of men and horses in 18 batteries.

PIONEERS.—One battalion staff, one company, one searchlight section.

COMMUNICATION TROOPS.—One telegraph company, conversion of the air and motor traction detachment into one air and motor traction battalion,

* An *Abteilung* corresponds to a British brigade of field artillery. A German *Brigade* consists of two regiments of artillery.

one air company. Increase of establishment of officers, men and horses in the railway battalion, the wireless telegraphy company, the draught horse section of the Telegraph Battalion, and the Motor Traction Company.

TRAIN.—Three companies.

SAXONY.

COMMAND STAFF, ETC.—Two *Landwehr* inspections.

INFANTRY.—One regimental staff, five battalions, eight machine-gun companies.

FIELD ARTILLERY.—Conversion of the *Abteilung* N.A. of two batteries of six guns each into one of three batteries of four guns each. Increase of establishment of men and horses in six batteries.

PIONEERS.—Two searchlight sections.

COMMUNICATION TROOPS.—One detachment with the Prussian Air Troop. Increase of establishment of officers and men of the detachment with the Prussian Motor Traction Battalion.

WÜRTTEMBERG.

COMMAND STAFF, ETC.—One *Landwehr* inspection.

INFANTRY.—One battalion, six machine-gun companies. Increase of establishment of rank and file in seven battalions.

FIELD ARTILLERY.—Increase of establishment of men and horses in three batteries.

PIONEERS.—One searchlight section.

COMMUNICATION TROOPS.—One detachment with the Prussian Air Troop. Increase of establishment of officers and men in the detachment with the Prussian Motor Traction Battalion.

ALL FOUR CONTINGENTS.

INFANTRY.—Addition of one lieutenant to the regiments and staffs of regiments with two battalions (excluding Bavaria). Addition of another staff officer to all regiments with three battalions. Addition of another captain to all regiments.

FIELD ARTILLERY.—Addition of one lieut.-colonel to one regimental staff of each brigade. Addition of another captain to the regiments not receiving a lieut.-colonel.

FOOT ARTILLERY.—Addition of a second ration for staff officers doing duty with regimental staffs.

Remarks, ADDITIONAL.—Changes of organization in the Corps of Officers with a view to an improved allotment of posts in the event of mobilization. The same object is served in all contingents by the creation of *Landwehr* inspections as in the single States.

Changes in Establishment in 1912.

The following table gives an analysis of the changes in establishment effected during the year under review of the provisions of the Law of the 14th June, 1912.

At the foot of this table the resultant total peace strength of the German Army on October 1st, 1912, is also shown.

It will be observed that the establishment of private soldiers and N.C.O.'s not above the rank of corporal before the end of 1912 reached a total of 531,004. There remain, therefore, only 13,207 men to be added between the end of the year under review and 1915, by which date the prescribed total of 544,211 is to be reached.

Defence Bill, 1912.

Alterations in establishments to be effected during 1912.

	Combatant Officers.	Medical and Veterinary Officers.	Non-commissioned Officers and Officials.	Rank and File.	Horses.
Infantry	595	28	1,963	14,330	88
Rifles	—	—	24	180	—
District Staffs	—	—	5	– 2	—
Cavalry	—	—	—	24	41
Field Artillery	276	42	846	3,332	2,973
Foot Artillery	170	14	290	1,419	1,533
Pioneers	89	6	319	1,844	325
Communication Troops:—					
(a) Railway Troops...	—	—	—	24	—
(b) Telegraph ,,	35	3	147	887	510
(c) Balloon ,,	25	3	60	345	—
(d) Inst. and Experimental Institute for Military Ballooning	– 6	– 1	– 13	– 50	—
Train	31	4	248	420	359
Special Formations ...	1	—	73	—	—
Non-Regimental Officers, etc.	86	11	36	—	—
Increase	1,302	110	3,998	22,753	5,829
Total Increase, all Ranks in 1912... ...	28,163				
Grand Total of Peace Strength of German Army on Oct. 1st. 1912.	27,267	3,177	94,696	531,004	126,480
Grand Total all Ranks	656,144				

NOTE.—The above table shows the total increases and decreases contemplated. The reductions in establishment are, however, only shown when they exceed the augmentations. In these cases the figures in question are preceded by a minus (–) sign.

In accordance with the provisions of the Army Estimates of 1912, a number of changes were introduced into the Prussian

Army, which were quite independent of those legislated for in the Peace Strength Law of 14th June, 1912.

The precise nature of these alterations and the dates from which they are to take effect are laid down in Prussian Army Order No. 106 (*Armee-Verordnungsblatt No.* 10) of the 30th May, 1912.

They may be briefly summarized as follows:—

A. To be Newly Formed.

Taking effect from 1st April, 1912.

One Train Inspection.
Six Commanders of the Train.
One Train Depôt Inspection.
One Commandant on the Island of Borkum.
Landwehr District Staffs and V. and VI. Berlin.
One Instructional and Experimental Institute for Military Aeronautics.
One post for a Local Communication Officer in Thorn.

B. To be Newly Formed.

Taking effect from 1st October, 1912.

One machine-gun company for No. 151 Infantry Regiment by conversion of No. 6. Machine-gun Battery.

One machine-gun company for No. 172 Infantry Regiment by conversion of No. 9 Machine-gun Battery.

Five draught horse sections to the foot artillery, one being allocated to each of the following:—

No. 1 Foot Artillery Regiment (Konigsberg i. P.).
No. 6 ,, ,, ,, (Neisse).
No. 9 ,, ,, ,, (Ehrenbreitstein).
No. 15 ,, ,, ,, (Ulm).

The Foot Artillery School of Gunnery at Juterbog.

(As second draught-horse section. The Foot Artillery School of Gunnery is already in possession of one draught-horse section, which will in future be known as No. 1 Draught-Horse Section of the Foot Artillery School of Gunnery).

C. Furthur Alterations.

(*a*) *Taking effect from 1st April,* 1912.

The commandant at Diedenhofen will in future have the rank and allowance of a Brigadier.

Magdeburg is given up as a fortress. The post of commandant, the local artillery officer and the committee of the artillery depôt at that place are consequently also abolished.

The establishment of the fortress of Helgoland, hitherto provisional, is now confirmed.

The posts of commandant of the following *Landwehr* district staffs will in future be held by pensioned officers, who will have the rank of regimental commanders:—

Rheydt, L. Bremen, I. Braunschweig, Wiesbaden, I. Darmstadt. In addition to this, the establishment of these five *Landwehr* district staffs will each be raised by one pensioned officer, as second staff officer.

The Experimental Detachment, the Experimental Company, and the Intendance of the Communication Troops will in future be known respectively as:—

The Experimental Detachment of the Military Communication Services.

The Experimental Company of the Military Communication Services.

The Intendance of the Military Communication Services.

(*b*) *Taking effect from 1st October,* 1912.

The regimental staff and the battalions of No. 171 Infantry Regiment are placed on the higher establishment.

The following will be included in the establishment of the Experimental Company of the Pioneers:—Two re-engaged men, 16 lance-corporals, and 106 privates. At the same time the establishment of this company is raised by two under-officers. The company is to wear the uniform of the Guard Pioneer Battalion, with a "V" on the epaulettes, shoulder-pieces and shoulder-straps in the same manner as the Experimental Detachment and Experimental Company of the Military Communication Service, but with yellow cord on the shoulder straps.

THE INSTRUCTIONAL AND EXPERIMENTAL INSTITUTE FOR MILITARY AERONAUTICS.—This institute is to be stationed at Doberitz. It is to be within the province of the Guard Corps, and is to be under the command of the Inspector of Military Air and Motor Traction Services.

The objects of this Institute are as follows:—

(*a*) To train the personnel to be employed in aeronautical duties, and

(*b*) To perfect the aeronautical equipment by means of experiments conducted at the Institute itself and in the light of experience gained from other sources.

Officers retain their present uniform. Non-commissioned officers and men wear the uniform of No. 1 Airship Battalion, to which the Institute is attached, but without any distinguishing marks on the shoulder straps.

Officers, non-commissioned officers and men who have served at the Institute or have received a special training in aeronautics, can, when passing to the Reserve or Landwehr, if found suitable, be transferred to the Reserve of Aeronautical Troops, which is about to be formed.

The establishment of the Institute is as follows:—

1 Staff Officer as Commander.
1 Captain.
4 Lieutenants or Second-Lieutenants.
1 Medical Officer (a Surgeon-Lieutenant or Second-Lieutenant).
1 Company Sergeant-Major.
1 Vice-Sergeant Major.
8 Under-officers.
1 Medical Under-officer.
45 Privates. } from the 1st
5 Lance-Corporals } October, 1912.

At the present time 50 lance-corporals and privates are attached to the Institute until 30th September, 1912.

The new 7th Army Inspection, with headquarters at Saarbrücken, consists of the XVth and XVIth Army Corps.

The headquarters of the two new Army Corps are situated as follows:—XXth at Allenstein, XXIst at Saarbrücken.

All further details concerning the changes effected by the provisions of the Army Bill, during the year under review, are to be found in Army Order 149, of 1st July, 1912.

RECRUITING.

Recruiting statistics for 1911. The figures given below were published in November, 1912:—

The number borne on the recruiting list in 1911 was 1,271,384, which is an increase of 26,021 on the figures of the preceding year, which amounted to 1,245,363. The number borne on the recruiting list was made up as follows:—

Men of 20 years of age	563,024
Men of 21 years of age	367,688
Men of 22 years of age	289,098
Men above 22 years of age	51,574

The following comparative table shows the classification of the numbers given above into the various categories during the years 1910 and 1911 respectively:—

CLASSIFICATION OF RECRUIT CONTINGENT.

	1910.	1911.	Totals. 1910.	Totals. 1911.
Numbers excluded from Military service	890	826		
Numbers physically unfit	34,067	35,500		
,, posted to the "Landsturm"	144,737	142,307		
,, posted to the "Ersatz" Reserve...	80,262	92,143	259,956	270,776
Contingent taken for the standing Army :—				
(a) Service with arms	201,530	207,741		
(b) ,, without arms	2,623	2,712		
	204,153	210,453		
Volunteers and men enlisted for special periods such as schoolmasters	37,363	37,528		
Total for the standing Army ...	...	...	241,516	247,981
Numbers posted to the Naval "Ersatz" Reserve	2,660	2,589		
Contingent taken for the Navy ...	12,156	13,472		
Volunteers for the Navy	2,287	4,916		
Total for the Navy	...	...	17,103	20,977
Number of men whose service was postponed, emigrants and excess numbers	...	...	726,478	731,650
			1,245,053	1,271,384

In addition to the above the following enlisted as volunteers in the Standing Army :—

	1910. *	1911. †	Totals. 1910.	Totals. 1911.
In the Standing Army :—				
One-year	13,145	13,582		
Schoolmasters	1,066	1,141		
Two-year	38,593	37,771		
Three-year	11,273	10,820		
			64,077	63,314
In the Navy	...	...	*5,069	†4,916
			69,146	68,230

* NOTE.—Of these, 1,749, 19, 18,007, 6,629 and 2,782 respectively, enlisted before reaching the military age (20).

† Of these, 1,755, 9, 17,486, 6,536 and 2,913 respectively, enlisted before reaching the military age (20).

The contingent taken compulsorily for the Army and Navy was made up as follows:—

	1910.	*1911.*
Men of 20 years of age	101,215	106,249
Men of 21 years of age	53,228	53,185
Men of 22 years of age	60,071	62,510
Men above 22 years of age ...	1,795	1,981
	216,309	223,925

Of the numbers taken compulsorily for the Army and Navy, 138,722 were born in the country and 85,200 in the towns.

It will be observed that the numbers distributed among the various categories in the two years under review do not differ very materially. There is a decrease in the number of volunteers in 1911, both for the Army and the Navy. There is an increase in the contingent taken compulsorily for the Army in 1911, which may be accounted for by the decrease in the number of volunteers and the additional numbers provided for by the *Friedenspräsenzstarke* (Peace Strength) Law of March, 1911. The contingent taken for the Navy is also larger in 1911 than in 1910.

In 1911, the number posted to the *Landsturm* was smaller, and the number posted to the *Ersatz* Reserve larger than in the preceding year. If the years 1909 and 1910, however, are compared in this respect, the exact reverse will be found to have been the case.

THE GERMAN BIRTH RATE.—The statistics for 1911 in the German Empire show an increase of population of less than three-quarters of a million—the least favourable return for nearly 20 years. The Prussian Government is now organizing an inquiry as to the cause of the decrease.

SUPPLY AND TRANSPORT.

The Train was reorganized in 1912, and now consists of two entirely separate branches, (*a*) the Train battalions (personnel), (*b*) the Train depôts (materiel).

WINTER EXERCISE OF THE POWER-TRACTION SECTION.—This exercise occupied the first half of February, and the following vehicles took part in it:—Seven ordinary motor cars, six army mechanical transport trains, one motor lorry, and one motor omnibus.

MOTOR TRACTION.—It is said that the total number of motor vehicles subsidized for military purposes amounts to 1,000 in round numbers. The result of the census of motors taken on January, 1912, was as follows:—Total, 70,318.

Of this number 53,132 were light motor carriages and 7,156 heavy motors.

Of the light vehicles, 20,508 were motor bicycles for personal use, 157 were motor bicycles for business use, 22,942 were motor cars for private use, 19,555 were motor cars for business use.

The census for 1912 shows an increase of 7.84 per cent. on that for 1911.

MANŒUVRES AND TRAINING.

IMPERIAL MANŒUVRES.—The Imperial Manœuvres took place in Saxony, north of Dresden, on the 11th, 12th, and 13th September, and were carried out by the IIIrd, IVth, XIIth (1st Royal Saxon) and XIXth (2nd Royal Saxon) Army Corps. A Division of Bavarian Cavalry was also formed and detailed to take part in the operations.

On the 9th and 10th September, cavalry exercises were carried out in connection with and leading up to the subsequent operations.

EXERCISES ON A LARGE SCALE.—In addition to the Imperial Manœuvres and the usual army corps and divisional manœuvres, the following exercises, on a large scale, were held:—

1. Attack exercises with blank ammunition by the Ist, IXth, and XIVth Army Corps;
2. The Guard Cavalry Division was concentrated for a three days' "battle training" on the Doberitz training ground;
3. Pioneer manœuvres took place under the 1st Pioneer Inspection at Posen, and under the 2nd Pioneer Inspection on the Rhine, between Mainz and St. Goar;
4. The Communication Troops took part in railway manœuvres.

ATTENDANCE OF ARMY OFFICERS AT NAVAL MANŒUVRES.—This year a number of Army officers of high rank were detailed to attend the Naval Manœuvres held during September. The officers included an Army Inspector (Field-Marshal Baron v. der Goltz), the Prussian War Minister, the Chief of the General Staff, the Inspectors of Field Artillery and Engineers and Pioneers, and the Commanders of the IIIrd, IVth and XIXth Army Corps. The presence of these officers has given rise to various rumours in the Press, but the most probable reason for their presence is the wish to bring the responsible heads of the Army more into touch with naval work, and so into sympathy with present and future naval expenditure.

COMBINED MANŒUVRES AT BORKUM.—Manœuvres were held to test the facility of reinforcing Borkum from the mainland and for landing troops against an enemy who might have gained possession of the island. The manœuvres are said to have been successfully carried out.

TRAINING OF RESERVISTS.—The system of training reservists in larger formations than has hitherto been the general custom, has received increased attention during the year under review. In several Army Corps, regiments and brigades were formed entirely of reservists, for training purposes. The former method was to train them by attachment to the battalions of the standing Army.

Opportunities were given this last summer to reserve officers to take part voluntarily in regimental training, extra to the obligatory training. For this purpose Government horses were placed at the disposal of reserve officers belonging to the mounted branches of the service.

Two reserve infantry regiments of the IXth Corps were formed for training—one from 12th to 25th April, and the other from 9th to 22nd May.

The infantry battalions of the IIIrd and IVth Army Corps, which took part in the Imperial Manœuvres, were made up to strengths of 700 non-commissioned officers and men, by means of reservists.

SIGNALLING.—New signalling regulations were issued in December, 1911, from which it is evident that greater attention is being paid than heretofore to this means of communication.

East Africa.

EXPERIMENTAL MOBILIZATION.—An experimental mobilization was carried out in March at Wilhelmsthal, the ex-soldiers (Askaris) being called up for ten days' training, and 32 out of 46 reported themselves, in spite of their not being in receipt of any pay as reservists.

VOLUNTEER CORPS.—A movement has been on foot for the formation of a Volunteer Corps, and papers have been sent out to ascertain the number of colonists who would be willing to join. As the Volunteer Corps would most likely be employed against natives only, residents who are not German subjects are being asked to join. The armament suggested is the '08 carbine.

EQUIPMENT.

LACE BOOTS AND LEGGINGS FOR OFFICERS.—An Army Order was issued in February authorizing lace boots and leggings to be worn by officers in lieu of top boots. No sealed pattern of legging has been laid down, and uniformity within units is not required.

ISSUE OF WIRE CUTTERS TO ALL ARMS.—It is reported that the issue of wire cutters to all arms of the service has been completed. They are to be carried partly by the troops and partly on wagons.

NEW PATTERN GLOVE.—It is reported that a new pattern cloth glove is to be introduced to replace the knitted gloves and fingerless mitts worn hitherto. The new glove is of the mitt type, but has a special finger for the trigger finger.

MACHINE-GUNS.—It was reported in the Press that the Small Arms Committee had decided against shields for machine-guns for use in the field, as being too heavy. It was also reported that machine-guns are to be provided with telescopic sights.

COMMUNICATIONS.

Railways.

STRATEGIC RAILWAYS.—The new railway, double line, from Remagen (on the Rhine) to Weismes (near Belgian frontier) was opened for traffic on July 1st.

Belgian newspapers reported early in the year that considerable progress was being made with the Stavelot tunnel.

The same papers discussed a projected railway, 50 kilometres long, from Reuland to Irrel, and thence to Treves, parallel to the frontier of Luxembourg. This would be a continuation of the Aix la Chapelle—Weismes (Malmedy)—St. Vith line.

ROLLING STOCK.—Lack of rolling stock in the Rhenish coal districts has resulted in considerable congestion in the railway system, and consequent monetary loss. It is proposed to spend £14,550,000, to be raised by loan, on existing railways and new extensions. In order to cope with deficiencies of rolling stock, the Prussian railway authorities in August ordered 706 locomotives and 14,000 wagons (in addition to passenger coaches and luggage vans), the delivery of which is to be spread over the next 12 months.

GERMAN SOUTH-WEST AFRICA.—A new railway from Arendis on the Swakopmund—Otavi railway to the Khan copper mine was opened for traffic in January. At the same time the construction of the railway from Keetmanshoop to Windhuk was reported as being completed. This line is known as the North—South railway, and it was originally estimated that it would not be completed before 1913. It was, however, opened for public traffic on the 8th of March, 1912.

It appears that there is no possibility that the projected line from Windhuk to Gobabis will be commenced before 1915.

GERMAN EAST AFRICA.—Railhead of the Central Railway reached Tabora on the 26th February; this section was not due to be completed before the 1st July, 1914, but the work was pushed on as Germany was afraid that the Belgian line to Lake Tanganyika (to be ready in 1914) would obtain a monopoly of the lake trade unless the German line arrived there first.

Tabora is 256 miles from Lake Tanganyika. Railhead reached 103 kilometres west of Tabora on 1st September, 1912.

BRANCH LINE TO LAKE VICTORIA NYANZA.—The success of the Uganda railway has led to the suggestion that a connection should be made from the central line northwards to Lake Victoria, to enable German East Africa to get its fair share of the trade on the Lake, which at present is entirely diverted to the Uganda railway. A steamship line to run in connection with the proposed railway is also advocated.

CAMEROONS.—It is anticipated that the first section of the Central Railway (one metre gauge) from Duala to Bidjoka (150 kilometres) will be opened for traffic on the 1st October, 1913, though trains will be run provisionally from the 1st October, 1912, on the portion completed by that date. Considerable delay has been caused in the construction of this railway by the difficulties experienced in bridging the numerous rivers.

KIAO-CHAO.—From a report recently issued, it appears that the Shantung railway, which connects Kiao-Chao with the Tientsin—Pukow line at Tsi-Nan-Pu, had considerable difficulties to contend with during the past year. During 1910 the condition of China had a paralysing effect on railway traffic, with the result that receipts decreased by over £10,000, whilst expenditure increased by over £5,000, necessitating reductions of one-half per cent. and two-and-a-half per cent. on the ordinary and preference shares. Heavy rains in September, 1911, did much damage to the permanent way. An agreement has been come to with the Tientsin—Pukow line, whereby break of bulk at Tsi-Nan-Pu will be avoided.

The new harbour line on to the mole at Tsing-Tau was opened in September.

RAILWAY REGULATIONS FOR THE AFRICAN PROTECTORATES.—Railway Regulations have been published (reproduced in *Deutsches Kolonialblatt*, 1/8/12) for the African Protectorates. Among other matters it is laid down that gradients of 1/40 should not as a rule be exceeded; and that bridges must be capable of bearing vehicles with a weight of three-and-a-half tons on each wheel.

Canals, Cables and Telegraphs.

CANALS.—It has been reported that the Rhine-Herne canal will be finished at latest by 1915. This canal, which is to join the Rhine with the Dortmund-Ems canal, traverses the whole of the most important industrial portion of Germany and the coal-fields of Westphalia. A number of canals throughout the Empire are either in course of construction or are about to be commenced, such as the trans-Continental canal due east beyond Dortmund.

The building of a vast network of canals and the canalization of the existing rivers, is the only means of meeting the demands of the public, as private steamship companies will then be able to use the canals and take part of the increasing traffic off the hands of the Government railways. Meanwhile, the proposal to build a canal from Wesel to Emden seems to be meeting with considerable opposition on the score of expense.

It was anticipated that the German cable from Monrovia to the Cameroons, which is later on to be continued to German South West Africa, would be laid by the end of the year under review.

WIRELESS TELEGRAPHY.—The wireless telegraphy station at Swakopmund, in German South West Africa, was sufficiently advanced in January for communication to be obtained with passing vessels. The tower is 278 feet high.

A wireless telegraph station was opened at Duala, in the Cameroons, on the 5th March. The radius of action is stated to be about 680 miles.

It was proposed early this year to instal a wireless telegraphy station at Dar-es-Salaam, in German East Africa, with a range of 600 miles, which will be able to communicate with towns on the shores of Victoria Nyanza.

The aerial of the installation at Atakpame in Togo is supported by three steel girder masts, 246 feet high and 245 yards apart.

A company has been formed to link up German possessions in the Pacific by wireless telegraphy. Four stations are to be built: at Rabaul, in New Guinea; Apia, in Samoa; Nauru, in one of the Marshall Islands; on Yap, which is one of the Caroline Islands. On Yap is the cable station of the German-Dutch Telegraph Society.

It was reported in the Press that the Swiss and German Governments had come to an arrangement to erect a wireless station on the Santis mountain (near Zürich), to secure communication with German East Africa in a direct line over the Alps, which have hitherto proved an unsurmountable obstacle.

HELIOGRAPHS.—The military force in German East Africa has established several heliographic lines of communication, and these lines have been open for the transmission of private telegrams since September, 1911. The experiment has been very successful. The original line was from Lindi to Massassi (78 miles), with three intermediate stations, but this system has now been enlarged.

FORTRESSES AND DEFENCES.

INCREASED GARRISON FOR BORKUM.—The garrison of Borkum was increased on the 1st February by a battery of foot

artillery. Several additional heavy guns were reported about the same time to have arrived at Borkum, apparently of 28 cm. calibre.

SYLT TO BE FORTIFIED.—The question of the fortification of the island of Sylt has been much discussed in the newspapers. General Schoot, in an article in the *Tag*, in October, pointed out that this is practically the only island left in the North Sea which the British fleet could use as a naval base in the event of war. By fortifying Sylt, British attacks on Helgoland on the Schleswig coast would be rendered impossible. Meanwhile, the Prussian Ministry of Public Works is reported to be engaged upon a scheme whereby Sylt is to be connected with the mainland by a railway embankment 12 miles long, at a cost of £250,000.

NEW HARBOUR WORKS IN THE NORTH SEA.—Among other works of the kind, money is being devoted to the construction of a harbour at Wyk on the island of Fohr.

WANGEROOG.—Considerable extensions in the fortifications of Wangeroog are reported to have been completed during the summer.

EMDEN AS A NAVAL PORT.—It is rumoured that it is under consideration to convert Emden into a naval port. The military garrison is to be considerably increased, and a regiment of foot artillery at Munster is stated to have received notice of its pending transferrence to Emden.

ARSENALS AND ESTABLISHMENTS.

MESSRS. KRUPP'S WORKS.—It appears from the annual report and balance-sheet of this firm that inclusive of a sum of £211,529, transferred from last year's account, a number of subsidiary receipts amounting to £112,698, and dividends from invested stock, amounting to £98,553, a *gross balance* is shown of £2,513,444.

Against this must be set taxes amounting to £250,210, compulsory workmen's insurance amounting to £222,728, and charitable expenses amounting to £352,532.

Thus there remains, exclusive of the balance carried forward from 1910-11, a *net profit* of £1,476,644, which, with last year's balance, amounts to £1,687,973. Out of this net profit 5 per cent., or £73,822, is to be transferred to the statutory Reserve Fund, the Security and Officials' Pension Fund are each to be augmented by £100,000, and a dividend of 12 per cent., or £1,080,000, is to be paid.

In addition to this, a sum of £9,000, for the salaries of the Directors, has to be met, after which £325,150 can be carried forward to next year's account.

The net profits have risen in the year under review by £40,830, which sum, though representing a substantial increase, does not constitute so remarkable an advance as that of £375,000 recorded last year.

The financial achievements of the firm are shown by the following table:—

	Net Profits. £	*Dividends Paid.*
1904/05	820,652	7½ per cent.
1905/06	1,036,904	10 ,, ,,
1906/07	1,242,213	10 ,, ,,
1907/08	924,408	8 ,, ,,
1908/09	780,381	8 ,, ,,
1909/10	1,063,265	8 ,, ,,
1910/11	1,435,613	10 ,, ,,
1911/12	1,476,444	12 ,, ,,

The value of the real estate on June 30th, 1912, is given in the annual report as amounting to £10,377,867, and after the necessary deductions had been made, as equivalent to £9,451,623.

The plant and transport equipment are valued at £466,945, and the half-finished and completed goods on the premises at £8,100,350.

The cash in the safe, change and balance at the bank amount together to £3,690,045.

The capital of the company has stood at £9,000,000 since 1907. The statutory Reserve Fund in this year's balance-sheet is shown at £394,078, and the Special Reserve Fund at £800,000.

It will be evident from the preceding figures that the prosperity of this great firm continues to increase.

CENTENARY OF THE KRUPP FIRM.—The firm of Krupp, at Essen, celebrated the 101st anniversary of its existence at the beginning of the month of August.

The Emperor and Prince Henry of Prussia, attended by the Imperial Chancellor and a number of Ministers, took part in the celebrations.

MISCELLANEOUS.

PROTECTORATE TROOPS BILL.—This Bill came up for its first reading on the 27th of February. Although it deals with the protectorate troops in all the German colonies it is based on the requirements of German South-West Africa, and aims at the creation of a reserve force in the various colonies.

GERMAN EAST AFRICA: *Disturbances on Southern Frontier.*—Newspapers reported in July that a native chief, who for some time past had been giving trouble to the Portuguese

authorities, had been raiding into German territory across the Rowma river. It was also stated that native patrols from Portuguese territory had carried off women and children from islands in the river, and that one such patrol had been captured in the act.

GERMAN SOUTH-WEST AFRICA: *Rumoured raid by Simon Cooper.*—An unfounded report appeared in the German Press in September to the effect that Simon Cooper had crossed the frontier from Bechuanaland with a large armed force. The German Colonial authorities, however, stated that the raiding party consisted of eight members of the notorious Simon Cooper's band, who crossed the frontier with the object of forcing some fugitive members of that band to return.

A PRESS LAW FOR THE COLONIES.—A new law dealing with the Press in the colonies came into force on the 1st April, 1912. The law conforms in the main to that for the home country. An interesting paragraph is to the effect that, in time of war, unrest or insurrection, the Governor of a colony can forbid the publication of news regarding warlike measures, movements of troops, etc.

COLONIAL MEDAL.—The Emperor has authorized the issue of a medal for all those who have taken part in military operations in German Colonies.

BOUNDARY COMMISSION.—The Franco-German Commission, which commenced sitting at Berne in June, concluded its deliberations on July 19th, and arrangements for the delimitation of the boundary on the ground were begun soon afterwards.

TRANSFER OF FRENCH TERRITORY.—The northern portion of the New Cameroons was formally handed over by the French on the 1st October.

GERMAN LOANS.—Two loans, one for £4,000,000 of new German Imperial Bonds, and another for £21,000,000 of new Prussian Consols, were offered for subscription on January 29th; both at 4 per cent., and redeemable in six years. Both these loans were, it was stated, over-subscribed to the extent of £2,500,000.

The £11,000,000 4 per cent. Imperial Treasury Bonds, and the £10,000,000 4 per cent. Prussian Treasury Bonds due on July 1st, were practically all renewed for periods terminating in 1914 and 1916, only £3,000,000 being redeemed.

GERMAN IMPERIAL FINANCES.—The final returns of Imperial revenue for the financial year 1911, which ended on April 30th, 1912, show a total surplus over estimates of £12,248,949; most of this surplus is accounted for by Customs. Army expenditure exceeded the estimates by £189,882, whereas naval expenditure was less by £56,000 than the estimates.

NEW GERMAN NATIONALITY LAW.—The Federal Council adopted in February the draft of the new Nationality Law, which makes the loss of German nationality more difficult and its resumption easier than before. It is provided that a German residing abroad who has not performed his military service before the end of his 31st year shall lose his German nationality.

NEW GERMAN NATIONAL DEFENCE LEAGUE.—This League (*Deutscher Wehverein*) was formally constituted on the 28th January. Its object was stated to be "the strengthening of the patriotic consciousness and the maintenance of a manful spirit in the people." The preliminary "programme" of the League is merely the supposed army programme of the Government slightly enlarged.

The general opinion as to the significance of this League appears to be that it is intended to perform for the Army services similar to those which the Navy League has so successfully rendered to the Navy. A membership of 4,000 was announced at the opening meeting. This League, which now numbers some 40,000 members or more, issued an urgent appeal in October to the nation demanding further increase in the armed strength of the country, on the ground that any of the three nations, England, France and Russia, can embroil Germany in a war in which the other two will join. Germany's inferiority in numbers to the combination of the three Powers, must be lessened by training more of her citizens in the use of arms. It also calls attention to the neglect of her veterans, and to the increase of cases of espionage.

INCREASE OF PAY TO THE RANK AND FILE.—The increase of pay to the rank and file of the German Army commenced on October 1st, and amounts to an annual increase of £350,000.

RENEWAL OF THE TRIPLE ALLIANCE.—The alliance between Germany, Austria-Hungary and Italy, was renewed in December, without any alterations in the terms.

DEATH OF THE REGENT OF BAVARIA.—Prince Luitpold, of Bavaria, died at Munich, on December 12th, at the age of 91.

THE BRITISH ARMY AND A CONTINENTAL WAR.

By A. DE TARLÉ, Capitaine d'Artillerie, Breveté d'Etat Major.

[Translated by Colonel H. Wylly, C.B., and published by kind permission of the author, and of the editor of the *Revue de Paris*.[1]]

THE cavalry operations and the Army manœuvres which, within the last few days, have come to a close in England, mark one more stage in the training of the British Army. Never before have such large numbers been brought together—four divisions of infantry and one of cavalry, that is to say, two-thirds of the Expeditionary Force, in addition to Territorial troops. The King evinced the personal interest he takes in the work of reorganization initiated some few years ago and pursued with such method and zeal, by honouring these operations for the first time with his presence. Possibly, also, he wished to appeal to popular sentiment, which, up to the present, has been somewhat indifferent to things military. The military representatives[2] sent by each of the Powers tended further to increase the *éclat* and augment the importance of these manœuvres.

It was with a natural pride that Englishmen enumerated to their guests all the improvements which have been effected in their military organization. The Air Corps already possesses three dirigibles, and will shortly be in possession of 131 aeroplanes. Despite the cruel accidents attending the opening of the manœuvres, this service did its work to the satisfaction of both sides.[3]

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1 From *Revue de Paris*, 1st October, 1912.

2 France and Russia were represented by Generals of Division.

3 Attention may be called to the absurd character of the information published by certain newspapers, according to which the Director of the manœuvres brought them to an end a day earlier than had been intended, because each commander had been so well informed by the aeroplanes of the movements of his opponent that further operations were impossible. The truth is that at the close of the 18th September, the forces on either side had become so intermingled that they would have had to be "sorted out" again if operations were to be recommenced, but a similar mixing up of troops constantly occurs both in France and Germany; it is the inevitable result of the operations of large bodies, in which the umpire staff, no matter how perfectly organized it may be, cannot always cause proper weight to be given to the effect of fire. As the action was still in progress at 6 p.m., troops could only have been retired after dark, and the directing staff preferred to cut short the manœuvres by a few hours rather than to impose this extra fatigue on troops who had been marching and fighting for three days without rest, and who, unlike our own troops, are not sheltered in billets.

Communication between the command and the different units is better maintained than with us, or in any other European Army, thanks to the existence of special communication companies employing the electric telegraph, "wireless," telephones, heliographs and flag signalling. Mechanical transport was used for the supply of rations and munitions, the recent improvements made in this service having permitted of the reduction of a hundred vehicles and twelve hundred horses in each division. Every unit possesses a field kitchen, formed of an ordinary cooking range carried on a wagon.

The progress in training is no less noticeable. In 1909 this was brought to notice by General Langlois, who, after the South African War, unhesitatingly denounced the weaknesses of the English Army. But during the last three years this army has effected a great deal, in the opinion of those soldiers who know it best. The infantry has just been given a new "Manual," in which the connection between fire and movement is emphasized; its lessons are admirably applied. In the use of ground, the careful methods of employing fire, fighting spirit, and in endurance, the British soldier, in the opinion of all who have seen him at work, is unequalled. We do not speak of his tenacity and traditional courage, as to which our ancestors of the *Grande Armée*—no mean judges—have rendered a striking tribute.

The cavalry is excellent; in a close country the squadrons are not stopped by any obstacles; the men are well mounted, and know how to take care of their horses, which were in good condition even after a fortnight's manœuvres and bivouacking in the rain. In spite of its anxiety to charge whenever it can find opportunity, the cavalry makes a thoroughly common-sense use of its rifle; it has, so to speak, the instinct for dismounted combat in its blood, and one can frequently see one or two squadrons leap to the ground and deploy along a hedge, in order to dislodge by fire a sheltered enemy against whom a charge would be ineffective. As to the horse and field artillery batteries, it was a pleasure to see them manœuvring at a rare pace; their magnificent teams recalling the memory of those splendid batteries which, by their behaviour and dash at the Alma and at Inkerman, called forth the admiration of our soldiers. They were on nearly all occasions so well placed that it was impossible to locate them. The British are now making efforts to apply the methods of fire in use with us, and here, too, the progress is remarkable.

The officers of all the different arms are working hard to make up for lost time. Younger than our officers and more wedded to sport, all they need is to familiarize themselves with the practical study of the higher branches of the military art wherein we have had the good fortune, during the past 20 years, of finding such leaders and masters as Maillard, Bonnal and Cherfils. They will effect this all the more quickly from

the fact that the majority of them have had war experience in Afghanistan, in Egypt, or in South Africa.

Assuredly all is not yet perfect in the British Regular Army; but the appearance it presented during the manœuvres is most cheering for those who believe that it will have a part to play in the event of a European War. Every occasion upon which Lord Haldane has been asked about his Territorial Army, he has declared that it is intended to "set free the Expeditionary Force"—that is to say, to enable it to be used for action beyond the seas—a burning question, and one which for long has been of the first importance. In the famous debate of the 21st November, 1911, in the House of Lords, it served as an introduction to a great discussion on the exact situation of the Territorial Army. To a suggestion by Lord Portsmouth as to possible military intervention in Belgium, Lord Haldane made answer that such intervention was too hypothetical to be worth discussion. Whereupon Lord Portsmouth and Lord Roberts—the latter in a letter to the *Times*—declared that this was anything but hypothetical, and that certain conditions might arise which would make it absolutely necessary to disembark the whole Expeditionary Force on the Continent in order "to preserve the balance of power in Europe and to secure the rights of this country."

The Expeditionary Force, the organization of which was the work of Lord Haldane, comprises about 156,000 men, contained in six strong divisions of infantry and one cavalry division, equivalent to four French or German army corps. For war purposes it is thus very far from being of no account. We rule out as unlikely the suggestion of a British disembarkation in the Danish peninsula, although the Germans sometimes discuss it, as also the idea of a diversion upon German territory; this has already formed the subject of a study in the *Revue de Paris*.[1]

These intentions, ascribed to the British because they were in accordance with their former military conceptions, are impossible to carry out under the conditions of modern war. Such expeditions against an enemy's country, while capable of giving results a hundred years ago—although the famous expedition against Flushing in 1809 was a complete failure[2]—would meet

[1] *Revue de Paris*, 1st December, 1909. The last phases of the German naval manœuvres (May-June, 1912,) took place in Danish waters, and included an attempted disembarkation at Borkum.

[2] The object of this expedition was to destroy the French fleet and docks at Antwerp, and thus to strike a direct blow at the Imperial power. Disembarking 45,000 men in the island of Walcheren at the end of July, 1809, they took 17 days to capture Flushing. Decimated by a dreadful epidemic of fever, they re-embarked at the end of a month without having been able to attempt anything against Antwerp, whither Admiral Missiessy's fleet had retired.

to-day with almost insurmountable difficulties, by reason of the existence of railways which allow of the rapid concentration of troops on the points threatened.

The idea of a disembarkation in Belgium must be taken more seriously. The British have always held that the establishment of a foreign Power in the Low Countries would be the greatest possible danger to the national security. As they are not unaware that Germany covets the mouths of the Meuse and of the Scheldt, the English might be tempted to forestall Germany by themselves occupying Belgium; the plains of Brabant and Flanders were always the favourite theatre of war for their armies on the Continent.

In this case the action of the British might take the form of furnishing the Belgians with the field troops they lack. Without any intention of going into the details of the defensive organization of Belgium, we may remember that General Brialmont created a very solid system of permanent works, but disproportioned to the number of men which the country can set in line. There are three great fortresses on the Meuse —Liége, Huy and Namur, and a great national *réduit* at Antwerp. The perimeter of these fortresses is very large—32 miles at Liége and 29 at Namur—and they need 90,000 men for their defence. The Belgian Army, on mobilization, would number about 160,000, thus leaving no more than 70,000 men to take the field, distributed in four divisions (each of two brigades), two cavalry divisions of 16 squadrons, *plus* a general artillery reserve. These troops are not sufficient in number to oppose the violation of Belgian territory by a German army. None the less, this eventuality is one which may be considered as very probable; the need for the Germans to utilize the constant increase in their population, and the idea, in vogue with them, of strategic envelopment, leads one to believe that they will extend their front far beyond the limits set by Moltke in 1870. This extension may be either to right or left, but it is not likely to be to the left, where they would find a difficult country and the stout army of Switzerland, which, in spite of its numerical weakness, is formidable by reason of its training and patriotism.

Their intentions are, it may be remembered, engraved on the soil by the lines of their strategic railways, and by the disposition of their detraining sidings. For one thing, there are three important lines of rail parallel to the Belgian and Luxemburg frontiers, which are provided with important detraining sidings. For another, between the great lines of penetration, Düsseldorf—Roermond—Antwerp and Coblentz—Trèves, there are five other distinct lines, connecting on the Rhine with those from Northern and Central Germany. Since these have absolutely no economic *raison d'être*, there can be no doubt as to their strategic object. Finally, everybody realizes the importance acquired within recent years by the camp of Elsenborn, only a few miles from the Belgian frontier.

The Belgian military authorities, among others, General Ducarue, admit the possibility of the violation of their territory; the most authoritative German military writers, for their part, speak of this operation as a certainty. But of all the numerous witnesses we will only mention Generals Falkenhausen and Bernhardi. They have traced the route of the army of the right German wing, composed of five or seven army corps. It starts from the base at Saint Vith—Trèves, and, covered in the direction of Malmédy by a strong flank guard, will arrive on the French frontier on the front Sedan—Carignan—Stenay on or about the sixteenth day after mobilization.

In spite of all that has been said upon the matter, we do not believe in an attempted *coup de main* against Antwerp at the commencement of war; the morsel would be rather difficult to swallow, and the Germans would hardly commit the gross blunder of risking a check which would weaken them both morally and materially, and which would necessitate the immobilization of at least two army corps before the fortress.

Neither do we believe that they would cross to the left bank of the Meuse, in spite of the facilities they would thus enjoy, as it seems, for entering Liège without firing a shot.[1] The country on the right bank—Condroz, Famenne, Ardennes—though more difficult, offers no really serious obstacle; it is traversed, coming from the north-east, by ten good roads. In the absence of mechanical traction the troops making use of them would be supplied by five lines of rail.

The march to the south of the Meuse, respecting the fortresses of Belgium and confining itself to making use of only a part of its territory, would offer the advantage of reducing to a minimum the breach of its neutrality, and of inciting the Belgians to adopt an attitude of observation. Not being themselves attacked, why should they attack? Nevertheless, should the Germans thus take the risk of moving across the front of an army whose intervention would be assisted by the existence of such bridge-heads as those of Liége and Namur, it follows that they must either look upon the Belgian Army as absolutely negligible, or they are certain beforehand that it will be indifferent to any violation of the national territory.

Is there any real foundation for these presumptions? It is a secret of the Courts and of the Chancellories.[2] But for some months past this idea of remaining passive or indifferent has been more than once put forward by the Belgians them-

[1] See article by "Landrecies" in *Questions Diplomatiques et Coloniales*, of the 1st May, 1912, and the revelations made in the Belgian Parliament as to the absence of ordnance and munitions in that fortress.

[2] After the death of Leopold II., the newspapers wrote of a formal understanding between him and the Emperor William as the price of the support given by Germany to Belgium on the occasion when the latter was being troubled by England about the Congo.

selves. In the spring of 1911, during the course of a tour made in France and Belgium by the Military Correspondent of the *Pall Mall Gazette,* to study on the spot the conditions under which the British forces could co-operate with ours, he was greeted in Belgium with confessions of a most disconcerting frankness.[1]

> "If England had a sufficiently powerful army to support her guarantee, and ready to fulfil its duty, then we would do our best to play our part pending the arrival on the scene of the British troops. . . . We would make a declaration of our neutrality in a circular note to the Powers, but we would do no more than this. . . We shall not fire a shot in defence of our neutrality; that would not do us any good. We shall wait upon events, and when we can see clearly which is the stronger side, that we shall join. Mere sentiment may make us lean to one side or the other, but we must think of Belgium and Belgium only; our safety is more to us than anything else."

Still more recently, a General in the Belgian cavalry published, under a transparent pseudonym, a pamphlet which aroused a very real interest in Belgium as well as in France.[2] The following is the gist of his remarks. He commences by drawing an unflattering picture of Belgian Parliamentarism, hopelessly incompetent and quite indifferent to all questions of national defence. Further he affirms that the perpetual neutrality, which was imposed upon Belgium in 1831 by reason of the requirements of the European balance of power, and in no way for Belgium's own advantage, is now no more than a mark of servitude, the removal of which should now be demanded. The more so that this neutrality is always at the mercy of a possible violation. The military organization of the Belgians ought now to aim at placing them in a state to resist any aggression directed against their independence. For this purpose Belgium needs a field army, powerfully organized, methodically trained, capable of manœuvring, and animated by the spirit of the offensive. Such an army would derive no small advantage from the special conditions in which it would be called upon to act, favoured by an exceptionally close network of railways and roads, and supported in its operations by solid fortified bases. Moreover, fortresses are made for the benefit of the field army, and any which, whether by their defective site or from any other cause, cannot be self-supporting, should be razed as soon as possible.

Having made this statement, the author, and it is here that the discussion becomes of interest for us, examines the case of

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1 *Pall Mall Gazette* of the 15th March, 1911. These words, brought up before the Belgian Senate, caused lively protestations; but the personality of Lieut.-Colonel A. Pollock, editor of one of the most important of the British military magazines, is a guarantee of their authenticity. He has also reproduced them in an article in the *Nineteenth Century.*

2 *Situation de la Belgique en prévision d'un conflit Franco-Germain,* by O. Dax. Brussels, 1912.

the violation of Belgian territory by one of the belligerents, and forcibly protests against the solution which has been offered, and under which Belgium shall declare herself against whomsoever shall first invade her.

Her fortunes would thus be bound up with those of the opposing party, and in the event of this turning out to be the weaker of the two, the country would share all the rigours of defeat. The question, then, for Belgium, is to range herself on the side of the stronger party, she would not then be *guided* by events, but would *direct* them. Then, since all hostile concentrations on her frontiers would be equally menacing—whether they are about Lille, Naubeuge, Mezières, or about Aix-la-Chapelle, Malmedy, Saint-Vith, she can turn to which she pleases prior to any violation of her territory.

The point which remains for decision is which of the two adversaries offers the best guarantee of ultimate success; the author of this pamphlet writes that up to recently he would not have hesitated to give the preference to the

> "mighty German Empire rather than to the French Republic, divided and torn and delivered over to a home policy of hatred and discord. Will this be the case now? Possibly. But, all the same, the correct and patriotic attitude of France during the negotiations connected with the Marocco question gives one occasion to pause and reflect on this matter."

Let us make a note of this eulogy upon our national revival—an eulogy all the more valuable because he who makes it is by no means an indulgent judge. He has seen clearly the weak point of our military organization—the contradiction existing between the omnipotence of the people and the hierarchy. Let us also profit by the advice which he offers us not to be under any illusions about a peace at any price.

The author of the pamphlet goes on to say that in order to form an opinion as to the respective importance of these two neighbours, Belgium ought to maintain military attachés at her Legations, and should send officers to attend alternately the French and the German army manœuvres. The remainder of the pamphlet is given up to a consideration of strategical questions which is inspired by the soundest doctrines; it concludes by advocating the suppression of the fortress of Liége, as being useless, and the maintenance of Namur, which should serve as the *point d'appui* for the field army.

In remarking on these views, the *Journal de Bruxelles,* a leading Catholic paper, observes that

> "Belgium would lose all the means for the free exercise of her sovereignty from the very commencement of a conflict, if she were rigidly bound to make her neutrality respected by force against all and sundry. 'What would she do,' it is asked, 'if England, France or Germany, were to demand the right of occupying her country under the pretence of keeping their engagements, and in order to defend her threatened neutrality?"

Lastly, we find a characteristic remark in an article from the pen of Major Girard, published in the *Tribune Nationale*, a military and colonial organ. The title, "La Belgique contre la Triplice et la Triple Entente," sufficiently indicates the subject. It is there stated that the best policy which Belgium could adopt would be definitely to conclude an offensive and defensive alliance with one or other of the two groups of States into which Europe is divided, after having, be it well understood, carefully weighed their respective chances of success.

Certainly these opinions do not find general acceptance in Belgium; they have raised remonstrances; and the King himself, speaking on the 23rd June last, on the occasion of the 75th anniversary of the raising of the Grenadiers, affirmed that it was the duty of the country to make its neutrality respected. But the fact that such opinions are discussed is a sign to which we must attach a certain importance, because it proves the existence of a party which is prepared to accept this solution. At any rate, it prevents one from sharing the optimism of certain French military writers, who bring the Belgian Army into all their calculations. But even if it had the will, it is for the moment too weak to play any real part.

In these circumstances, the arrival of the British in Belgium is incomprehensible, unless it were to force the Belgians to forsake their passive attitude and take sides against the Germans. Also it would have the inconvenience of supplying these latter with an excuse and a pretext for violating Belgian neutrality. Further, it may be asked whether, even in this case, a threat against the enemy's left flank would be as important strategically as some people think. There is no doubt that the Germans would not seek for decisive results on this side, and would be content to protect themselves by a flank guard, commensurate with the number and value of their adversary; to contain him they would make use of all the resources to be found in rearguard tactics, in such a manner as to leave to the main body of the right wing its freedom of march and manœuvre, and allow it to take part in the main battle. The German Army would certainly be weakened, but insufficiently so, and if it obtained a success in France, the British forces, even combined with those of Belgium, would not count heavily enough, and would hesitate to play the part of *hostage* on the Continent—a *rôle* the British dread above all others.

The main thing for them is rather to co-operate in the decisive battles than to attempt a diversion, the results of which would be uncertain. In that way they would conform to the principle that the whole forces disposable should act together. One may also believe that their value would be enhanced by the mere fact that they would be fighting by our side.

The place of the British is then indicated as being on our (French) left flank. Even if they could bring us no more than a *part* of their Expeditionary Force, or of their 156,000 men,

this addition of two, three or four army corps would be a very precious one for us, as making up for the weakness caused by our numerical inferiority. It is not the case that victory always sides with the big battalions; to accept that idea would be to deny any value to other elements of success in war—the genius of the commander, the training of the troops, quality of the armament, moral superiority, power of manœuvre—but, if history does show us that the most brilliant victories have been gained by armies inferior in numbers, but better commanded, and animated by that warlike spirit which is irresistible, it also reminds us that often the very bravest troops have been crushed by the mere weight of the masses of the enemy, and have been vanquished by the arrival of hostile reinforcements which completed their overthrow.

A very simple calculation establishes the fact that, as compared with the Germans, we are the weaker by several army corps; the law recently passed by the *Reichstag* gives the Germans several new units, which will add to their superiority. It does not matter whether it is two, three or more corps; the discussions entered upon to decide upon the actual number may be of use to soldiers as helping them to find a basis for study; they have only a limited interest for the general public, since they depend upon unknown elements, which give them something of a fictitious character—I may instance the secret of our own concentration, that of the Russians, and the possible attitude of the Italians. The studies recently made by Colonel Boucher and General Maitrot have presented the subject under different aspects. We shall not return to this; but we can state that the presence of the British on our left flank would provide for us a very valuable help. From the moment when they have set foot upon our soil, nothing is easier to imagine than their appearance at the front. All that is wanted is to move quickly, and, to this end, to make as much use as possible of the railways leading from the shores of the English Channel to the Belgian frontier, or to the Meuse; the disembarkation would be effected in all our ports, from Havre to Dunkirk. A simple glance at the map shows which are the lines of rail which will take them to the scene of action.

It is necessary that they should be in a position to take part in the battle in which the bulk of the opposing armies will be engaged. If we admit the correctness of the calculations worked out in the studies already mentioned, this battle may take place after the sixteenth day of mobilization. It is, therefore, by that date that the British must come up into line with us.

We have reason to believe that they will be able to do this. Lord Haldane gave to the perfecting of the Expeditionary Force the same amount of effort that he devoted to the Territorial Army, and the British Staff has now made such advances

towards the preparation of a speedy mobilization, such as has never before been attempted, the Expeditionary Force having previously been intended rather for a Colonial war than for military intervention on the Continent. We know that a serious defect has been made good by the measure now taken for obtaining on requisition, and in the shortest possible time, the 50,000 horses which are required.[1]

There is, however, this difficulty—the large proportion of reservists reckoned in the composition of the infantry battalions, who would require a fairly long period of training to give them that homogeneous character without which a unit is incapable of doing itself justice. The war establishment of a battalion, excluding the men remaining at the depôt, is 979 men, of which 470 are serving soldiers and 529 are reservists.[2] This proportion of reserve men is not much higher than with us in those corps which are not included in our *troupes de couverture;* but the majority of these men have left the active army four years and more, which constitutes a serious inferiority. Finally, instead of rejoining the company in which they formerly served and where they would again find the officers and non-commissioned officers who had originally trained them, they are incorporated in units of which they know neither the officers nor the men, thus losing the moral and material value of *encadrement,* the main factor in the value of a force composed of active and reserve elements. The factor does not rise to its full height until the commingling of these elements is completed, and under such conditions as these an appreciable time is needed—the British say six weeks.

In an article in the *Nineteenth Century* of October, 1911—an article which attracted a great deal of attention—Lieut.-Colonel Pollock affirmed that the presence of reservists in the units could only tend to weaken them, until they are thoroughly amalgamated, and that he would prefer to accept in their stead soldiers of less than 20 years of age. The regulations require that these should be left at home in the event of the departure of the Expeditionary Force; but this is not because they are not equally good soldiers with the others, but because they are considered too young to support the fatigues of foreign service.

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1 Let us mention the publication at the end of December, 1911, of an order regulating "requisitions" in a hostile and civilized country—up to now wholly wanting. These are indications that the eventuality of a Continental war is not lost sight of.

2 This is how the *Times* Military Correspondent arrives at the figure 470: the peace establishment, 777 men, is never reached, and only 560 are of the age of 20 and considered fit for field service; out of these again, 15 must be deducted as having less than six months' service. Each battalion gives 50 men to the mounted infantry units, thus reducing the total to 495. Finally, five per cent. are reckoned as unavailable at the last moment, which does not appear to be an exaggerated estimate.

This reason would not hold good in the case of a campaign in France. Colonel Pollock considers that it would be better to embark the Aldershot division at once, just as it stands, rather than run the risk of arriving in France too late. Its presence beside our *troupes de couverture* would produce a tremendous moral effect in France. So far as the remaining divisions are concerned, they would come up as quickly as possible, and nothing would be lost by their not being up in line with us for the first battle of the campaign. Despite the anxiety of the Germans to strike a decisive blow at the very outset, the result of the next war will not be decided by the initial blow; others will follow in which the fortune of war may turn and victory will fall to the side which can "stay" the longest. It is impossible to belittle the value of a reinforcement which will bring us three or four army corps of fresh troops, of a courage equal to any trial.

To the British military writer the situation presents itself very clearly; he would have no hesitation on the part of his country to come to our aid in a Continental war since, he says,[1] "the defence of England is the defence of France; our very existence depends upon our at once sending to the Continent all our available men to assist France, for if we do not make up our minds to defend London on Continental fields, we shall soon have to do it on the Surrey hills, and on the plains of the Eastern counties." But all Colonel Pollock's fellow citizens are not equally convinced of the necessity, and the idea is still vigorously contested.

There is, first of all, one party which will not listen to any talk about intervention; this is the one which protested quite recently against all idea of an alliance "which was incapable of adding anything to the strength either of France or England." The principal objection raised by the Radicals to an alliance is concerned as much with home as with foreign politics; they believe that it will give a new argument to the partisans of conscription; others say that the powerful army thus formed would prove a constant temptation for the diplomatists to intervene in European matters.[2] We will not discuss this point, having no wish to make incursions either into political or diplomatic territory.

But some even of those who recognize it is the duty of England to give France the support of her soldiers, believe that this could not be given at the outset of the war. "The Territorial Force," they say, "is incapable of fulfilling its duty without several months of training; and the departure of the

1 *Pall Mall Gazette*, March, 1911. *Outlook*, 10th February, 25th May, and 15th June, 1912. The *Morning Post* and *Observer* expressed themselves equally categorically.

2 *Daily Chronicle*, 26th May, 1912.

Expeditionary Force would leave the country exposed, without means of defence, to the dangers of invasion. It is, therefore, impossible even to think[1] of sending away the Regular Army until the country has no need to fear the risk of invasion, and for this the fleet must have established supremacy at sea."

The statement that the Territorial Army[2] would be incapable of repelling invasion proves that the work done by Lord Haldane does not inspire any great confidence among Englishmen. The article which appeared here a few months ago[3] shows that the goodwill and the patriotism by which the Territorials are inspired, are not by themselves enough to repair the inherent weaknesses of the Force.

We must take care not to conclude from this that the security of the British Isles could be compromised, for so long as the English fleet has not been destroyed, they are secure from invasion. In France we can scarcely realize to what extent this uncertainty occupies the English mind, which has always, as it would seem, remained under the "Great Terror" of 1804. This dread, encouraged by the Press, causes questions in Parliament to be addressed to the Ministers, who reply as well as they can.

The opinion of the Government has varied. Mr. Balfour declared in 1905 that the possibility of a hostile invasion might be absolutely rejected. Since then, Mr. Asquith and Lord Haldane have agreed,[4] after consultation with the Committee of Imperial Defence, that the disembarkation of a corps of 70,000 men could be successfully conducted. The question is one of those to which it is very difficult to make a definite reply, the experience of past wars showing that an operation of this kind has in it a considerable degree of hazard and of chance.

Those who declare that it would be a simple matter for the Germans to put ashore on British soil the equivalent of two army corps, point out how this operation would be facilitated by modern steamships, combining large size with great speed. It is true that the eastern shores of England are within 12 or 15 hours' steam of the German coast, and Lord Charles Beresford—a pessimist—has said that the security of England is at the mercy of a day's fog; but it must not be forgotten that the advance of science and industry favours the defence equally

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1 Some go so far as to say "even to think of doing so could only be done by a madman or a criminal."

2 270,000 men, to whom must be added 56,000 serving soldiers under 20 years of age, or having less than six months' service; 35,000 Regulars and 55,000 special reservists.

3 *Revue de Paris*, 1st March, 1912.

4 Particularly on the 29th June, 1909. This statement has frequently since been repeated.

with the attack; "wireless," for signalling the approach of an enemy's transports, submarines to sink them, all these amply make up for any advantages to be derived from the steamers of Hamburg and Bremen. Neither can one disregard the coast batteries and the mobile defences; the British estuaries and ports are fortified, and one can hardly imagine a disembarkation of troops in an enemy's country taking place except at an important harbour. The British have not failed to draw comforting conclusions from what happened in Tripoli at the time of the landing by the Italians;[1] the Turks made no effort to interfere with the operations, either the passage or the disembarkation; the African coast was far more favourable than the English shores upon which it is supposed that the Germans will descend; none the less, the Italians required three weeks to embark, transport and disembark 35,000 men. Under such conditions what chance of success would this imaginary force of 70,000 men of which mention is made, have, even if the bulk of the fleet were out of the way. The torpedo-boats and submarines of the coast defence would be enough of themselves to prevent it. In spite of all the minute precautions taken by the Japanese to prepare the way for the disembarkation of the Second Army in Korea, the landing operations took exactly nine days. This army was composed of three divisions and a brigade of artillery, altogether 64,000 men, that is to say, a considerably smaller force than that which would be required to attempt an invasion of England with reasonable hope of success.

It was in reliance upon these arguments that Admiral Sir Arthur Wilson, First Sea Lord, denied the possibility of invasion. His report, published as an appendix to General Sir Ian Hamilton's book against compulsory service, was made use of to prove the uselessness of conscription. It was the cause of a vigorous reply by the Military Correspondent of the *Times*, who assumed for this occasion the pen of an imaginary colonel of the German Staff—one "von Donner und Blitzen." He made out that the German transports would get through by running the gauntlet of the submarines and torpedo-boats, while the German ironclads drew upon themselves the fire of the British fleet. All the same, Admiral Sir Arthur Wilson's paper must be taken seriously. One must admit that a "raid," if not quite impossible—Bonaparte twice crossed the Mediterranean, avoiding Nelson—presents at any rate a very feeble chance of success in face of the British defensive organization.

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NOTE.—The author then quotes the text of Admiral Sir A. Wilson's memorandum, from pages 210—212 of the second edition of "Compulsory Service," ending with the conclusion: "that an invasion on even the moderate scale of 70,000 men is practically impossible."

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[1] *Contemporary Review*, January, 1912. "The invasion of Tripoli; a reassuring lesson for Great Britain."

To sum up—this reasoning is clearly expressed, but the mistake the Admiral made was wishing to generalize in order to prove the impossibility of passing the Expeditionary Force over to France. When, in the month of September last, the question was gone into by the Admiralty and the General Staff, Admiral Sir Arthur Wilson, in the quality of First Sea Lord, refused to accept responsibility for the immediate crossing, repeating the doctrine always accepted by British sailors: an operation of this kind cannot be carried through until the Navy has given the Army a safe-conduct—that is to say, has gained absolute command of the sea by destroying or blockading the enemy's squadrons.

This theory, admissible in full in the case of a considerable sea-voyage—if for instance it was a quesion of sending troops to Denmark or Russia, is not applicable to the passage of a narrow strait like that of Dover, only 21 miles in breadth and easy to defend. Hostile ships could always be signalled a sufficiently long time in advance to permit of the transports seeking shelter in a French or English port. But this question of "the command of the sea" has stirred British opinion to such a degree that it merits our dwelling upon it here.[1]

First of all it is necessary accurately to define this frequently employed expression—"The Command of the Sea."

The Naval Correspondent of the *Times* says that it is no more than a purely strategic expression implying a state of war, and that of itself it has no significance whatever in time of peace. Even in war time no Power either possesses the command of the sea nor can use it effectively until either after a victory, or thanks to certain strategic dispositions which have obliged the enemy, alarmed at the deployment of superior force, to retire. One does not occupy the sea in the same sense that one occupies a territory; it remains a domain common to all nations and over which lines of communication cross. Since an enemy can deny the use of the sea to merchant ships or to transports by occupying certain important points on these lines —like places where several streets meet—the only way to secure the passage is either to dislodge or to defeat the enemy.

The command of the sea represents, strictly speaking, "the complete and effective control of maritime communications;" so long as it is in dispute, the operations of either side are limited by the condition that neither of the two can exercise complete control over the communications of the other. "I consider that I possess the command of the sea," said Admiral Sir Geoffrey Hornby, "when I can inform my Government that it can send an expedition whithersoever it wishes without having to fear any intervention by a hostile fleet."

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1 The *Times* of 4th January, 1912. *United Service Magazine* of January, February, and March, 1912.

It may, however, happen that the Power to which its naval superiority has given the command of the sea, may lose it again by faulty strategy; thus, during the War of American Independence, the British Government retained the fleet in territorial waters, instead of sending it to attack the French transports crossing the Atlantic. During the Crimean War the Russian Black Sea fleet did nothing, although it was quite powerful enough seriously to have impeded the disembarkation of the Allies in the Crimea.

These examples expose the weak point of the definition given above. But, putting aside the hypothesis of a strategic blunder by either side, the Admiralty requires a decisive victory as the indispensable condition for the safe transport of the Army. The reply has naturally been made that, on this reasoning, any movement of troops outside the British Isles would be impossible, so long as a single German torpedo-boat remains afloat! Is one to be alarmed at the blustering of the Germans who, undertaking to obstruct the crossing, say that "rather than be forced to oppose the Expeditionary Force on land by a body of equal strength, it would try to prevent its disembarkation."

This attitude of the Admiralty in September, 1911, is in singular contrast to the magnificent confidence which the people still have in England's naval superiority, in spite of the progress of German armaments. To the "Man in the Street," the British "Dreadnoughts" would make but one mouthful of the enemy's squadrons; moreover, the latter would not dare to risk a battle, and the British ships would merely have the bother of blockading the Germans in their ports!

The refusal of the Admiralty to undertake the duty asked of it was equally based, so it was said, upon the fact that the departure of the whole of the Regular Army, by diminishing the security of the country, would so greatly increase the difficulties of defending the shores as seriously to disturb the strategic combinations of the fleets.

The error of doctrine is here fundamental. It was Admiral Mahan who formerly was responsible for the idea that the true objective of a fleet was always the fleet of the enemy; but, in trying to apply this rule strictly, there is a risk of taking for the *end* what is really only the *means*. The Americans did not make the Spanish fleet their main objective, and the Japanese sent their transports to sea under increased risks—before even their fleet had reconnoitred Port Arthur. In reality, the mission of the fleet is subordinate to the general strategic objective. In the case we are considering, the Expeditionary Force must first of all be taken over to the Continent. The main objective of the fleet is then to assure the success of this operation by preventing the enemy from approaching the zone wherein it

is being effected; it has to co-operate with the Army in the execution of the plan of campaign which the Government should have elaborated during peace; it can never be a question of its trying to gain a victory quite apart from the plan of campaign.

This is exactly what was *not* done in England, since, at the moment of the last crisis, the members of the Cabinet found themselves in disagreement as to the manner of employing the naval and military forces. This warning had the good effect of calling attention to a serious blot in organization. The Government did not hesitate to take the necessary steps to put matters to rights. On the 26th October, on the eve of the re-opening of Parliament, Mr. Winston Churchill replaced Mr. McKenna as First Lord of the Admiralty, the latter becoming Home Secretary.

One of the first acts of the new Minister was to modify the composition, and consequently the spirit, of the Board of Admiralty. The new Council could thus work in complete accord at the study of questions, connected with organization, which might appear to them to be of an urgent character.

The truth seems to be that the necessity had been recognized of having new men to carry out new ideas. These set at once to work and began by the creation of a Naval War Staff. The reform had long been called for in naval circles; it had been the main subject of a series of six letters which appeared in the *Times* in February and March, 1910. Admiral Lord Charles Beresford had again and again spoken of the need of it, and only quite recently, speaking at Portsmouth, he had taken recent events as a text for demanding the realization of his proposals.

He got what he wanted, and on the 8th January the order organizing the Naval War Staff was published. It is composed of three sections: the intelligence section (already in existence); the operations section, charged with the preparation of plans of campaign for every case which might occur; and lastly a third section for mobilization, whose business it should be to examine in detail all the different measures to be taken for conducting to the best advantage the plan of campaign drawn up by the second section.

This creation should give to the Navy the brain which shall co-ordinate the efforts of all in the preparation for war; it is to secure that co-operation which is indispensable between the Navy and the Army. Separated by watertight compartments, it had been impossible hitherto for them to work together; hence the differences of ideas which Mr. Balfour mentioned and deplored in 1905, and which had now again been shown by irresistible evidence. Henceforth the two Staffs will work out together the solution of the great problems of national defence, and if they should be unable to agree, there is the

Committee of Imperial Defence, which Lord Haldane looked upon as furnishing a link between the fleet and the Army.[1]

But this Committee of Imperial Defence, a real Cabinet Council, to which are admitted consulting members on technical matters, and which is presided over by the Prime Minister, contains in itself an element of weakness; that is ministerial instability. The ideas of the Cabinet of to-day are not those of the Cabinet of to-morrow. Continuity of ideas is safeguarded solely through the existence of the permanent secretariat; despite its numerical weakness this organization is more like an Imperial General Staff than is the body actually called by that name. The British military writers have all suggested that its development should be secured upon larger bases, so that it could ally with its present functions the general direction, under the authority of the Cabinet, of the naval and military forces acting in combination. The chief of this Imperial General Staff, as thus constituted, should be alternately a sailor and a soldier.

But while we await this reform, the progress already made is enough, practically, to ensure that there shall be no repetition of the regrettable differences of views which came to light last autumn. The intervention on the Continent of the British Army is a diplomatic and military act too serious for its execution to be left to an eleventh hour inspiration. If the Government should thus decide, in agreement with the Committee of Imperial Defence, then the duty of the Navy and of the Army must be worked out in all its details. In the words of Pitt, they should be employed like a single weapon, the one being the blade and the other the hilt.

As to the principle of co-operation, we say, with the *Observer*, that if Great Britain is to confine herself in the event of war to the proposal that she shall defend our shores, that for us would be an absurd offer. Let us here add that an exaggerated importance is given to the *rôle* she might play by starving Germany through the capture of her merchantmen. "However unpleasant this statement may be," writes Count Reventlow, in the *Deutsche Tages Zeitung*,[2] "the French ought to realize that the German population can, in case of need, draw its food supplies from its own territories." This assertion is contradicted by Herr Arthur von Gwinner, director of the *Deutsche Bank*,

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[1] The Committee of Imperial Defence was created in 1904. It has as regular members, seven Ministers, two being representatives of the Admiralty, and two of the War Office; in addition, members are selected from among eminent soldiers and sailors; finally there is a permanent secretariat, composed of naval and military officers of the rank of captain, and also of colonial officials.

[2] "British participation on the Continent in a Franco-German War," *Deutsche Tages Zeitung*, 29th February and 1st March, 1912.

according to whom,[1] Germany annually imports cereals for a seventh of the population—say, nine million inhabitants; but it would have the resources of the Italian ports and of the Ottoman railways, while the projected connection between the Rhine and the Danube will further facilitate the solution of the supply question by way of the Balkan States.

The latter author concludes thus: "Nothing but the effective participation of the British Army in Continental battles can give the smallest value to the Entente Cordiale."

If British public opinion has not yet definitely adopted this idea, one may believe that it will be led to do so by one of those sudden changes to which it is accustomed. Profoundly contemptuous of any mere abstract idea or principle, England will once more show us that, when her greatness and her safety are at stake, she always knows how to adopt the interests of the moment as her supreme rule of conduct.

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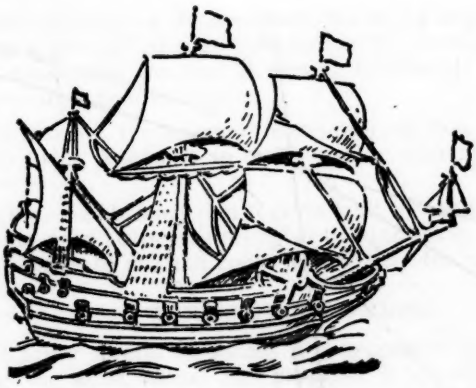
[1] *Nord und Süd*, July, 1912.



THE TORPEDO FIRING PROBLEM.

By ROMEO BERNOTTI, Primo tenente di Vascello.

(Translated from the *Rivista Marittima*, December, 1912, by Commander R. H. Keate, R.N., and published by permission).

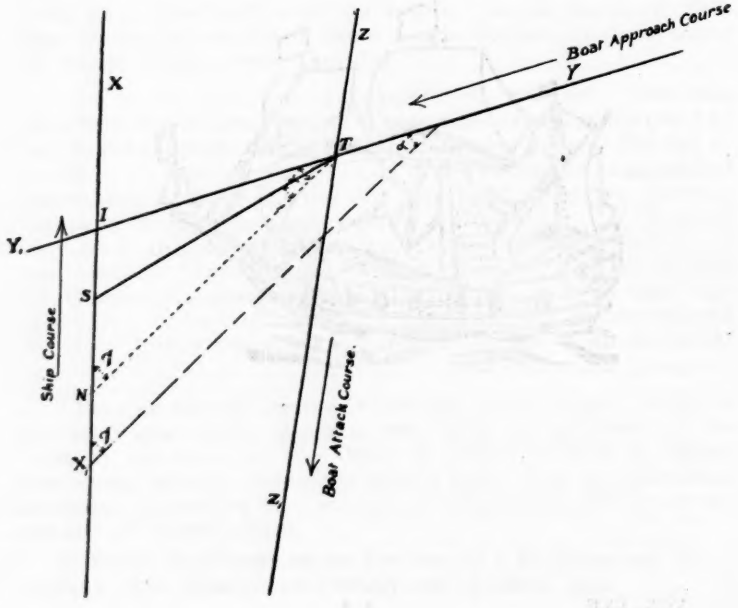
TRANSLATOR'S NOTE.—In specifying angles, the first word denotes course, and the second bearing, thus: boat-torpedo angle=angle between boat course and bearing of torpedo from boat; the word "courses" is added if required to specify an angle between courses.

We propose to discuss the problem of firing a broadside or series of torpedoes from a torpedo-boat against an enemy vessel in the way best calculated to obtain a hit. For this purpose it is necessary to consider first the procedure for firing a single torpedo.

SINGLE TORPEDOES.

As is well known this problem apparently admits of very simple solution, by means of the director or triangle of velocities, but in practice, especially at night, unless able to attack

Fig. 1



from ahead, the instrument is liable to error from the difficulty of keeping the enemy course bar parallel to the enemy course at the moment of turning from the approaching to the attacking course. It is therefore desirable to aim without this instrument.

Let XX_1 (Fig. 1) represent the enemy ship course, YY_1 the torpedo boat course meeting the ship course at I.

Suppose we wish to attack, as usual, in the bow sector, and that the tube is trained on the off side during the approach. At a convenient moment the boat turns to ZZ_1, which is the course bringing the tube to bear along TS, so that $\frac{NS}{TS} = \frac{V_s}{V_s}$; V_s being ship speed, V_s torpedo speed, γ ship-boat angle at firing moment, β torpedo-ship angle at firing moment or firing angle.

From triangle SNT, $\text{Sin } \beta = \frac{V_s}{V_s} \text{ Sin } \gamma$, (1.) and we get the following:—

TABLE I. (To obtain Firing Angle β).

Ship-Boat Angle.	Estimated Ship Speed in knots.			
	8	10	12	14
45	9°	12°	14°	17°
90	13	17	21	24

On commencing the approach, the firing angle, as given by the upper line of Table I., is intimated to the torpedo firer, and if it is found that the boat is getting further aft from the ship, the lower line must be used.

To obviate the extreme inaccuracy of thus attempting to get the firing angle, it is better to fire several torpedoes, as follows:—

It may be objected that it is difficult to use a table at night, but being used at the beginning of the approach, there would be some distance to go, and consequently time for it.

TORPEDO BROADSIDES.

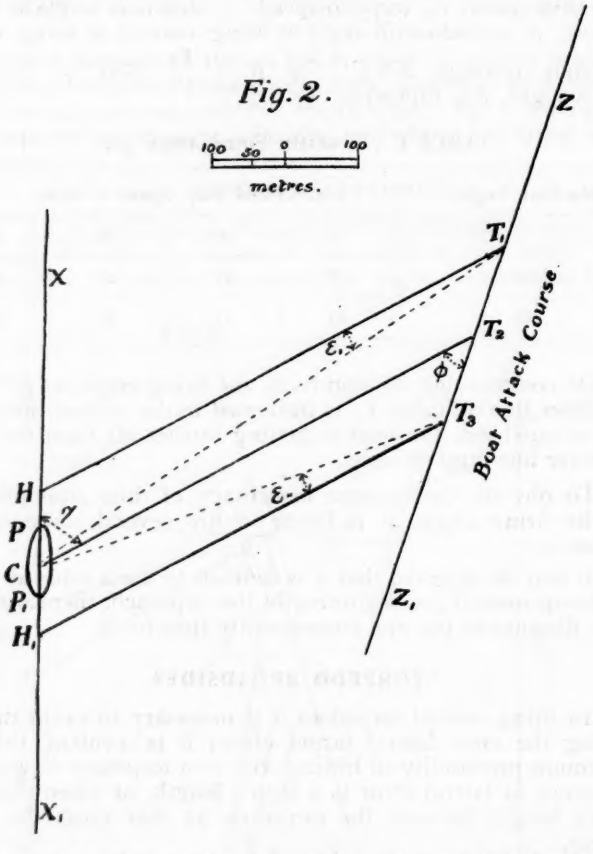
In firing several torpedoes it is necessary to avoid their all having the same lateral target error; it is evident that the maximum probability of hitting with two torpedoes is when the difference in lateral error is a ship's length, or when there is a ship's length between the torpedoes as they cross the ship's course.

To apply this idea it is not necessary to fire all the torpedoes at once (as in firing *a ventaglio* with the directions of the tubes diverging), it is not even requisite that the torpedoes should reach the target course simultaneously. On the contrary, firing at short intervals of time is easier in every way, if,

for instance, three torpedoes are fired, and it is arranged that if the central one hits the ship centre at a certain moment the foremost one will a little earlier pass a ship's length ahead of the centre, and the after one a little later, a ship's length astern of the centre.

By eliminating simultaneous firing, we eliminate divergent firing; the tubes can be trained parallel to each other, but with the sight bars set at different angles; the boat's course being steady between the discharges, the torpedo tracks will be parallel and the firers will fire as their sight bars come on the centre of the target.

Fig. 2.



In order to form a clear conception, let us take a fixed target ship (Fig. 2), P being the bow, and P_1 the stern, and suppose the boat able to fire three torpedoes from one side, and wanting to obtain the same separation between the torpedoes as for the moving ship. Then if the central torpedo is directed at C, the

ship centre, the other two will be directed towards H and H_1, so that $CH = CH_1 = L$=ship's length. If ZZ_1 is the boat course and the tubes are all trained at a boat-torpedo courses angle ϕ, the successive discharges will occur at the points $T_1T_2T_3$, when H, C, and H_1 are respectively in line with the foremost central and after tubes. It is clear that the torpedo-ship or firing angle for the central tube is zero, but that the points H and H_1, being imaginary, the other tube sight bars will be set at certain angles. The point aimed at is always the target centre; in the triangles HCT_1 and CH_1T_3 the firing angles ϵ_1 and ϵ_{11} are given by :—

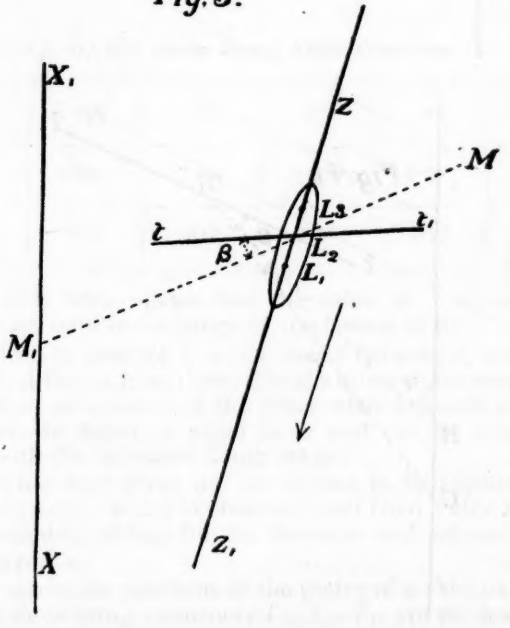
$$\text{Sin } \epsilon_1 = \frac{L}{r_1}. \sin \gamma. \qquad \text{Sin } \epsilon_{11} = \frac{L}{r_{11}}. \sin \gamma. \quad \Big\} \quad (2).$$

when $\gamma = XCT_2 = XHT_1 = XH_1T_3$ = ship-boat angle at central firing moment r_1 and r_{11} being the ranges at the first and third firing points respectively.

Let us now consider the general case of firing at a moving ship.

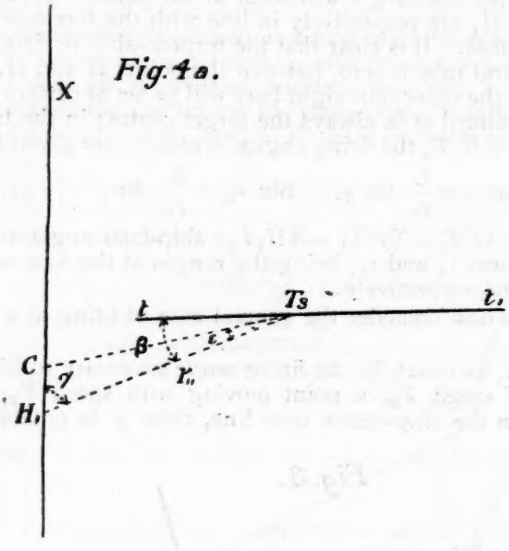
Let β, as usual, be the firing angle necessary to hit with a torpedo of speed V_s, a point moving with speed V_x, from a position on the ship-centre boat line, then β is obtained from (1).

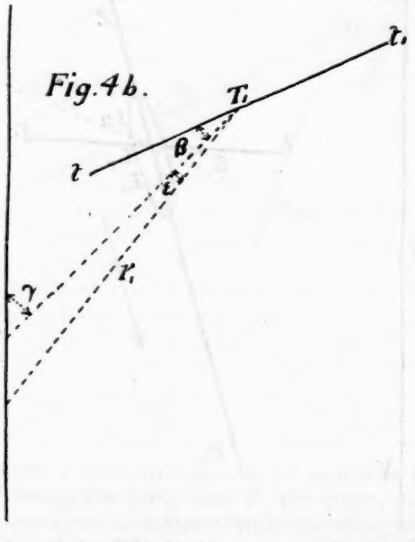
Fig. 3.



In Fig. 3 the boat steers along ZZ_1 as convenient for firing, and has three tubes L_1, L_2, L_3, trained parallel to tt_1, or at the

boat-torpedo courses angle ϕ. Suppose the firing angle β to be used for all three tubes, and let MM_1 be the line of sight, and XX_1 a parallel to the ship course, making the angle γ with





the lines of sight. Then to hit the centre C and the points H and H_1 of Fig 2, at distances L before and abaft the ship centre,

we must fire at the moments when H, C, and H_1 are on the lines of sight; in fact, at those moments, the point-torpedo angles will also be γ.

It is evident, then, that if H and H_1 were visible, the firing angles would be equal; but being imaginary, the angle β must be corrected for the extreme tubes to allow for the lines of sight being directed at the centre.

Figures 4 *a* and 4 *b* represent the positions T_1 and T_3 of the foremost and after tubes relative to the centre C and to the points H and H_1. Then the angle $tT_3H_1 = tT_1H = \beta$ and $XHT_1 = XH_1T_3 = \gamma$.

Therefore the foremost firing angle is $\beta + HT_1C$, and the after firing angle is $\beta - CT_3H_1$, and the corrections HT_1C and CT_3H_1 are respectively ϵ_1 and ϵ_{11} of Formula (2) when r_1 and r_{11} are the firing ranges.

The problem is now reduced to finding ϵ_1 and ϵ_{11}.

Let r be any value of the range to target-centre, and ϵ the corresponding firing angle, as found by the formula:—

$$\text{Sin } \epsilon = \frac{L}{r} \cdot \text{ Sin } \gamma \quad . \quad (3).$$

For a ship's length $L = 100$ metres, we have the following values of ϵ.

TABLE II. (To obtain Firing Angle Correction ϵ).

γ \ r	600	700	800	900	1000
45°	6°·40′	5°·50′	5°·00′	4°·30′	4°·10′
90°	9·40	8·10	7·10	6·20	5·50

From this table we see that the value of ϵ is not much affected by an error in the range of 100 metres or so.

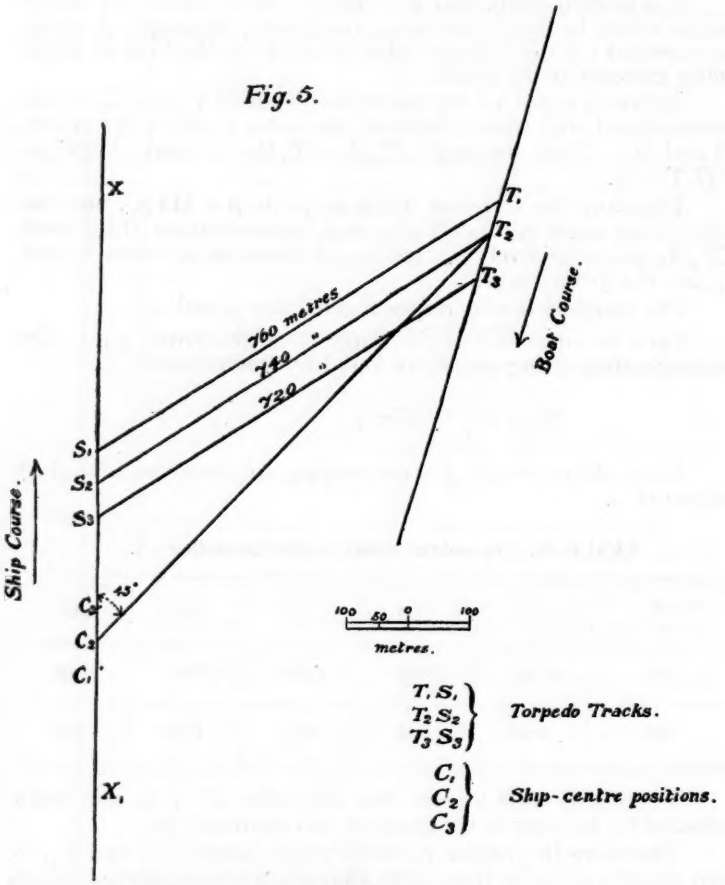
Therefore in practice r, which varies between r_1 and r_{11}, is but slightly different from them, the time intervals between firings being so short on account of the great relative speed, so that ϵ_1 and ϵ_{11} can be taken as equal to ϵ and can be taken from Table II. with the estimated firing range.

This table then gives the corrections to be applied to the central firing angle (which is obtained itself from Table I., as for a single torpedo), adding for the foremost and subtracting for the after torpedo.

Fig. 5 shows the positions of the centre of a ship 100 metres long at the three firing moments; T_1, T_2, T_3, are the boat firing positions, T_1S_1, T_2S_2, T_3S_3, are the torpedo tracks, taking $V_s = 12$ knots, $V_2 = 18$, $V_3 = 34$; ship-boat angle at central firing

moment = 45°; ship-centre boat firing range = 900 metres; boat-torpedo courses angle = 45°. Distance between tubes = 10 metres.

Fig. 5.



The following are the results:—

First or foremost firing angle 14° +5°.
Central firing angle 14°.
Third or after firing angle 14°− 5°.

$C_1C_2=(T_1T_2+10)\frac{V_s}{V_t}=75\times\frac{12}{18}=50$ metres.

$C_2C_3=(T_2T_3+10)\frac{V_s}{V_t}=75\times\frac{12}{18}=50$ "

First interval = about eight seconds.
Second interval = about eight seconds.
$r_1=T_1C_1=990$ metres; $r_{11}=810$ metres $=T_3C_3$.

These results confirm what we said above as to considering ϵ_1 and ϵ_{11} equal.

The following calculation is convincing as regards the advantage of multiple torpedo firing.

Let ΔV_s = error in estimating ship speed; then to hit the ship with a single torpedo :—

$$\Delta V_s \leqq \frac{\pm \frac{1}{2} L}{t}$$

t being the time run of the torpedo; whereas with three torpedoes fired as above explained, the upper limit of error permissible is defined by the track of the after torpedo striking the ship's bow, and the lower limit of error is defined by the track of the foremost torpedo striking the ship's stern, or :—

$$\Delta V_s \leqq \frac{\pm \frac{3}{2} L}{t}$$

So that in the example of Fig. 5, with a single torpedo :—

$$\Delta V_s \leqq \pm 1{\cdot}1 \text{ m.s.} = \pm 2{\cdot}2 \text{ knots.}$$

and with the triple broadside :—

$$\Delta V_s \leqq \pm 6 \text{ knots.}$$

If two torpedoes only are to be fired we can do without Table II., giving ϵ correction to firing angle; it will suffice to fire at the bow for the foremost torpedo, and at the stern for the after one. However, as at night the ship is but a black mass, we do not believe in firing at the extremities, but prefer to apply ϵ which is found by formula (3) putting $\frac{1}{2}L$ for L, or making half the correction in Table II.

THE WAR IN THE BALKAN PENINSULA.

(*Continued from the February* JOURNAL, *page* 257.)

A. POLITICAL AND GENERAL.

TURKEY.—Izzet Pacha was appointed Commander-in-Chief on January 29th. At the beginning of February a Committee of National Defence was organized with Marshal Fuad Pacha, hitherto bitterly opposed to the party of Union and Progress, as its President. The Government removed the restrictions placed on the free circulation by night of the streets of the capital, and brought into force on January 17th a provincial law of requisition.

During the last week in January, contracts were signed with Krupp for 20,000 shrapnel, and with the Karlsruhe Ammunition Factory for 120 million rounds of small arm ammunition.

BULGARIA.—The Bulgarian authorities are preparing to take a census of the population of the occupied Turkish territories.

GREECE.—On February 20th, the Powers withdrew their warships from Crete and hauled down their flags, entrusting the Turkish flag to the Consular body. The island is now under the Greek flag.

MONTENEGRO.—On February 7th, King Nicholas received the chiefs of the Malissor tribes, who expressed their loyalty to Montenegro, and their desire that they should be incorporated in the Kingdom, rather than in Albania.

Over 3,000 Malissors have joined the Montenegrins before Scutari.

RUMANIA.—Rumania's demand for compensation from Bulgaria on account of her neutrality during the Balkan War was again pressed on the resumption of hostilities. On February 21st, the Rumanian Cabinet decided to accept "mediation" by the Powers, and on the 24th, Bulgaria left the question to the decision of the Powers. Owing to the Hague convention, Rumania is at liberty to reject the advice tendered by the Powers as the result of "mediation." Bulgaria, having agreed to accept the arbitration or decision of the Powers, must abide by it.

SERVIA.—In the first days of February, the Servian authorities began to levy a "War Tax" of 11 per cent. on certain articles imported into the occupied Turkish territories from Salonica and Durazzo.

On the resumption of hostilities all freight traffic was stopped on the Servian railways to facilitate the movement of troops and stores.

Towards the end of January, the last Christian Turkish prisoners in Servia were released and sent to their homes.

According to the Press, about the middle of February 120 Q.F. guns, with ammunition and other war matériel arrived at Salonica from Marseilles for Servia. The personnel for new batteries was being collected at Nish.

B. LAND OPERATIONS.

EASTERN THEATRE.—On January 29th, a note from the Allied delegates at the Peace Conference was handed to the Turkish delegates, announcing the rupture of the negotiations. The following day General Savoff denounced the armistice. Hostilities recommenced at 7 p.m. on February 3rd. On this date the First and Third Bulgarian Armies were still before Chatalja. The Second Army was before Adrianople. The composition of these Armies was as before the armistice.

Chatalja.—No important engagement has taken place at Chatalja. Shortly after the recommencement of hostilities the Bulgarians withdrew, leaving rearguards in their old positions. On February 6th the Turks moved forward, but their advanced troops have now reached a line only some ten miles west of Chatalja. The rest of the army still occupies the Chatalja lines.

Adrianople. At 8 p.m. on February 3rd, the Bulgarians began to bombard the town, continuing till 11 p.m. The bombardment was then carried on intermittently, but no assault had been attempted up to the end of February. Turkish sorties have been reported.

Bulair.—Reports regarding the fighting at Bulair are very conflicting. On February 4th, the Bulgarians attacked the Turkish advanced posts north of the Bulair Lines, and on the following day drove them back to the main position. The Bulgarians entrenched on the high ground about Hexamili. On February 7th fighting recommenced; the next day the Turks, said to be 30,000 strong, attacked 10,000 Bulgarians of the 7th Division, but were driven back to the Bulair Lines. It is officially stated that the Bulgarian losses amounted to 103 killed and 435 wounded. The Turks place their losses at 335 killed and 495 wounded. The Bulgarian official account places the Turkish losses at about 15,000. On February 8th (9th according to some accounts) the Turks attempted to land the Xth Army Corps at Sharkeui. The attempt failed. The Corps then sailed to Gallipoli.

Since the middle of February snow has put an end to all military operations in Thrace.

WESTERN THEATRE: *Scutari.*—Heavy fighting took place round Scutari between February 6th-9th. On February 6th, the Servians, said to number 15,000, captured Bushati (seven miles south of Scutari). On the 7th, the Montenegrins, under Vukovich and Martinovich, delivered serious attacks on Bardanjolt and Tarabosh respectively, while the Servians endeavoured to advance to Berdica. Bardanjolt is said to have been taken, after desperate fighting, but the other attacks were unsuccessful. The Montenegrins are said to have lost 4,000 men, and the Servians 1,000 in the four days.

Albania.—It is reported that the Turks and possibly other interested parties have been doing their utmost to stir up Albanians against the Servian garrisons of Albania. It is stated that 12,000 armed Albanians are in the neighbourhood of Tirana, and 15,000 near Dibra.

Large numbers of rifles have been introduced into the country.

Epirus.—An attack on the Turkish positions round Yanina was begun on March 4th, the Greeks advancing in three columns against the west front. On March 5th, while the Greek right and centre delivered a containing attack, the left wing made a successful assault, capturing several important positions. At 2 p.m. on the 6th, Essad Pacha surrendered, with, it is said, 33,000 troops, and the Greeks entered Yanina.

C. NAVAL OPERATIONS.

The Turkish cruiser "Hamidieh" coaled and replenished supplies at Ras Sudr (20 miles south of Suez), and later at Malta.

The battleship "Assar-i-Tewfik" has become a total wreck near Midia.

GREECE.—On February 19th part of the Greek fleet, with transports, was reported to be at Mitylene. It was reported that the 1st Division was in the transports.

NAVAL NOTES.

GREAT BRITAIN.

The following are the principal appointments and promotions for February :—

APPOINTMENTS.—Rear-Admiral D. Beatty, C.B., M.V.O., D.S.O., to succeed Rear-Admiral L. Bayly, C.V.O., C.B., as Rear-Admiral Commanding First Battle-Cruiser Squadron, to date March 1st; Vice-Admiral Sir G. Le C. Egerton, K.C.B., to succeed Admiral Sir W. H. May, G.C.B., G.C.V.O., as Commander-in-Chief, Devonport, to date March 20th; Admiral Sir G. A. Callaghan, G.C.V.O., K.C.B., as Commander-in-Chief of the Home Fleets, appointment extended until December, 1914, making a period of three years in all.

PROMOTIONS.—Admiral Sir W. H. May, G.C.B., G.C.V.O., to Admiral of the Fleet, in the vacancy created on retirement of Admiral of the Fleet Sir C. F. Hotham, G.C.B., G.C.V.O., on March 20th.

ROYAL MARINES: PROMOTION TO COMMISSIONED RANK.—Following on the recent regulations providing for the promotion of selected warrant officers and men of the Royal Navy to commissioned rank, the Admiralty have now approved of a similar privilege being extended to the Royal Marines.

Two commissions will be granted annually to selected warrant officers, non-commissioned officers and men. On selection they will be given the rank of Acting Royal Marine Gunner, and after undergoing courses in gunnery and torpedo, will proceed to the Royal Naval College, Greenwich, for instruction in military and other subjects. On passing a qualifying examination they will be granted the rank of second-lieutenant, Royal Marines, and be appointed to a headquarter division. Here they will join the officers' mess, and will receive a gratuity of £100 for uniform and outfit, and £10 for mess entrance and subscriptions. Their pay will then be 10s. a day.

After further instruction in military subjects, and a period of service afloat, they will be eligible for promotion to lieutenant, and will then come under all the existing regulations for the corps.

In addition to the grant of commissions as outlined above, any warrant officer, non-commissioned officer or man of the Royal Marines will be eligible for the grant of a combatant commission for specially meritorious service or distinguished war service.

ENTRY OF SUPPLEMENTARY LIEUTENANTS.—In order to meet the increasing requirements of the fleet, the Board of Admiralty have decided as an exceptional measure that a limited number of Royal Naval Reserve officers between the ages of 22 and 32 shall be considered for entry as officers of the Military Branch on a Supplementary List of the Royal Navy. Candidates will be selected from officers of the Royal Naval Reserve who have completed or are undergoing 12 months' training in the Royal Navy; they will be required to undergo a medical examination. Selected candidates will be entered as lieutenants or sub-lieutenants, R.N. Sub-lieutenants will be eligible for promotion to lieutenant after one year's service in the Royal Navy, or from the date

on which they would have been eligible for promotion to lieutenant in the Royal Naval Reserve, but they may be appointed as acting-lieutenants at any period of their service.

In the case of officers who have not fulfilled the service required by the Board of Trade for examination for master, promotion will be subject to their passing an examination to be held by the Board of Trade. Lieutenants on the Supplementary List will be eligible for promotion to commander in cases of very exceptional service.

The rates of full pay will be the same as for lieutenants and sub-lieutenants, R.N., and sub-lieutenants on the Supplementary List will receive a messing allowance of 1s. a day in addition. Half and retired pay and gratuities will be at the rates laid down for existing officers on the Supplementary List. The rates of full, half, and retired pay mentioned above are shown in the Quarterly Navy List.

Applications for entry on the Supplementary List must be forwarded in the usual service manner through the Admiral Commanding Coastguard and Reserves.

ROYAL NAVAL RESERVE.—It has been decided to reduce the period which candidates for appointment as probationary sub-lieutenant must have served at sea with a Board of Trade certificate from five to three and a half years, but candidates must not be less than 21 years of age.

TYPES OF CRUISERS.—It has been decided to discontinue the use of the terms "armoured cruiser," "protected cruiser, first class," "protected cruiser, second class," "protected cruiser, third class," "unarmoured cruiser," and "scout." In future cruisers will be officially divided into three classes, namely, "battle-cruisers," "cruisers," and "light cruisers."

The term battle-cruiser will continue to be used as at present.

The term cruiser will be used to designate all vessels at present classified as armoured cruisers, and protected cruisers first class.

The term light cruiser will be used to designate the remaining cruisers and the vessels hitherto classified as "scouts."

FOURTH CRUISER SQUADRON.—The old Training Squadron, consisting of the cruisers "Leviathan," "Donegal" and "Royal Arthur" was abolished on February 8th, when a new squadron was brought into being with the title of the Fourth Cruiser Squadron. The flag of Rear-Admiral E. E. Bradford was struck in the "Leviathan," at Devonport, on the completion of his two years' appointment in command of the Training Squadron, and that of Rear-Admiral Sir Christopher Cradock, on his assuming the command of the Fourth Cruiser Squadron, hoisted in the "Donegal," from which vessel it will be transferred to the cruiser "Suffolk" when she has been prepared for flagship duties.

The squadron, which consists of eight ships of the "Edgar" class, will also carry out boys' training duties; it will be based on Queenstown, and will be divided into two groups, of which the parent ships will be the "Gibraltar" and "Endymion."

NAVAL BASE AT CROMARTY.—It is understood, says *The Times*, that the old battleship "Renown" is to be fitted for service as a receiving depôt at Cromarty. As has already been stated, Cromarty Firth is to be utilized as a naval base to a greater extent than hitherto. In his speech introducing the Navy Estimates on March 18th, 1912, the First Lord of the Admiralty stated that the question was being considered carefully,

whether, pending the completion of the docks at Rosyth, one of the floating docks when ready should not be towed to Cromarty and used there as a subsidiary base until the larger base is further developed. It would appear, continues *The Times,* that a decision on this point has now been arrived at, and that, in addition to the provision of reservoirs for oil, with coal and other stores on the Firth, a floating dock is to be placed there, while, at the same time, the headlands at the entrance are to be fortified.

It was partly in order to inspect the site of the proposed naval defences at Cromarty that the Prime Minister and the First Lord of the Admiralty went to Scotland at the end of January, although owing to the inclemency of the weather, this portion of their visit had to be abandoned. In his speech at Dundee, however, the First Lord alluded to Cromarty as one of the naval stations along the North-East coast which are acquiring particular importance. It is understood, adds *The Times,* that whatever is done in connection with the defence of Cromarty, will be carried out by the Admiralty, and when the forts are completed they will be garrisoned by marines, who will live afloat, and the purpose for which the "Renown" is being fitted out is to afford accommodation for them, so that no barracks will be required. The work should be expeditiously and economically carried out, and it is hoped that everything will be completed by the end of the year.

THE BATTLESHIP "MALAYA."—An order was provisionally placed on February 7th with Sir W. G. Armstrong, Whitworth & Co. (Limited), Newcastle-on-Tyne, for the hull, machinery, armour and armament of the battleship "Malaya," which is being presented to the Royal Navy by the Federated Malay States. The battleship, which will cost about £2,250,000, will be built at Messrs. Armstrong, Whitworth's new shipyard at Walker, which is now ready for occupation. The machinery is to be constructed by the Wallsend Slipway and Engineering Company (Limited), of Wallsend-on-Tyne.

The Dominion of Canada and Imperial Defence.

The debate on the Canadian Navy Bill entered upon its final stages on February 27-28th, when it passed the second reading with a majority of 114 to 84, in the Dominion House of Commons. The title and text of the Bill are as follows:—

An Act to Authorize measures for Increasing the Effective Naval Forces of the Empire.

His Majesty, by and with the advice and consent of the Senate and the House of Commons of Canada, enacts as follows:—

From and out of the Consolidated Revenue Fund of Canada there may be paid and applied a sum not exceeding $35,000,000, for the purpose of immediately increasing the effective naval forces of the Empire.

The said sum shall be used and applied under the direction of the Governor in Council in the construction and equipment of battleships or armoured cruisers of the most modern and powerful type.

The said ships, when constructed and equipped, shall be placed by the Governor in Council at the disposal of His Majesty for the common defence of the Empire. The said sum shall be paid, used, and applied, and the said ships be constructed and placed at the disposal of His Majesty, subject to terms, conditions, and arrangements to be agreed upon between the Governor in Council and His Majesty's Government.

RETROSPECT.—Before dealing in detail with the proposals of the Bill itself, it will be convenient to review briefly the events which have led to its introduction. The present Canadian Government came into office on October 10th, 1911, on the defeat of Sir Wilfrid Laurier's proposed naval scheme, and a Cabinet was formed with the Rt. Hon. R. L. Borden as Premier. The main issue before the Dominion electors was the naval question, and on the close of the Parliamentary Session Mr. Borden, in company with several of his colleagues in office, visited England to consult with Ministers here. The visit extended over the whole of July and August of last year; and, upon their return to the Dominion, steps were at once taken to summon Parliament, though an adjournment until the beginning of the present year had been announced.

The Canadian Parliament met on November 21st, when His Royal Highness the Duke of Connaught, in the course of his Speech from the Throne, made reference to the opinion of his advisers, "that the effective naval forces of the Empire should be strengthened without delay. My advisers are convinced that it is the duty of Canada at this juncture to afford the reasonable necessary aid for that purpose. A Bill will be introduced accordingly." This Bill, as set out above, was introduced by Mr. Borden, on December 5th, with a speech which exhibited a masterly grasp of naval policy and a wide conception of Imperialism.

MR. BORDEN'S SPEECH.—At the commencement of his speech Mr. Borden referred to his visit to England and the conferences held there with the Committee of Imperial Defence and the Admiralty. He then laid before the House the Memorandum drawn up for him by the Admiralty[1] and devoted mainly to the comparative expansions of the British and German Navies during the past ten years. Mr. Borden then proceeded to deal with the building and maintenance by Germany of a formidable fleet in the North Sea, which has compelled the concentration of the British Fleet in home waters to the detriment of the trade routes. The following passages may be quoted:—

"The great outstanding fact which arrests our attention in considering the existing conditions of naval power is this. Twelve years ago the British Navy and the British flag were predominant in every ocean of the world and along the shores of every continent. To-day they are predominant nowhere except in the North Sea. The paramount duty of ensuring safety in home waters has been fulfilled by withdrawing or reducing squadrons in every part of the world, and by concentrating nearly all the effective naval forces in close proximity to the British Islands. In 1902 there were 55 British warships on the Mediterranean station; to-day there are 19. There were 14 on the North American and West Indies station; to-day there are three. There were three on the South-east coast of South America; to-day there is one. There were 16 on the Cape of Good Hope station; to-day there are three. There were eight on the Pacific station; to-day there are two. There were 42 on the China station; to-day there are 31. There were 12 on the Australian station; to-day there are eight. There were ten on the East Indies station; to-day there are nine. To sum up, in 1902 there were 160 ships on foreign and Colonial stations against 76 to-day. Do not imagine that this result has

[1] This Memorandum was presented as a Command Paper [Cd. 6513/1912] to our own Parliament at the same time, and will be found on page 1753 of the December, 1912, issue of the JOURNAL.

been brought about by any reduction in expenditure, for the case is practically the reverse. Great Britain's total naval expenditure in 1902 was less than $152,000,000 (£30,400,000). For the present fiscal year it exceeds $220,000,000 (£44,000,000). Why then, has the naval force of the Empire been so enormously reduced throughout the world while at the same time the expenditure has increased nearly 50 per cent.? For the simple reason that the increasing strength of other navies, and especially of the German Navy, has compelled Great Britain not only to increase her Fleet, but to concentrate it in the vicinity of the British Islands, and there has been, of course, a substantial increase in the strength in home waters. In short, the strain of meeting changed conditions has been so heavy and unceasing that, in spite of the largely-increased expenditure and every possible exertion, the Admiralty has been compelled by the pressure of circumstances to withdraw or diminish the forces throughout the world which, in time of peril, safeguarded the security and integrity of the King's Dominions, and, in time of peace, were the living and visible symbol of the tie that unites all the subjects of the Crown. . . . .

"The fact that trade routes, vital to the Empire's continued existence, are inadequately defended and protected by reason of the necessary concentration in home waters is exceedingly impressive, and even startling. Even during the present year the battleships of the British Mediterranean Fleet, based on Malta, have been withdrawn and based on Gibraltar, in order that they might become more easily available for necessary aid in home waters. The Atlantic Fleet, based on Gibraltar, has been withdrawn to the vicinity of the British Islands for the same reason. Under such conditions the British flag is not predominant in the Mediterranean, and with every available exertion of the whole Empire it may be impossible to regain the necessary position of strength in that great highway before 1915 or 1916. Austria-Hungary with only 140 miles of sea coast and absolutely no colonial possessions, is building in the Mediterranean a formidable fleet of "Dreadnoughts," which will attain its full strength in about three years, and which will be supported by strong battleships of the pre-"Dreadnought" type, and by cruisers, torpedo craft, and other necessary auxiliaries. The fleet of Italy in the same theatre will be even more powerful and more formidable."

Mr. Borden then proceeded to outline the Canadian Government's proposals:—

"In presenting our proposals it must be borne in mind that we are not undertaking or beginning a system of regular and periodical contributions. I agree with the resolution of this House in 1909 that the payment of such contributions would not be the most satisfactory solution of the question of defence.

"Upon the information which I have disclosed to the House, the situation is, in my opinion, sufficiently grave to demand immediate action. We have asked His Majesty's Government what form of temporary and immediate aid can best be given by Canada at this juncture. The answer has been unhesitating and unequivocal. Let me again quote it:—

"'We have no hesitation in answering, after a prolonged consideration of all the circumstances, that it is desirable that such aid should include the provision of a certain number of the largest and strongest ships of war which science can build or money supply.[1]'

[1] Paragraph ten of Admiralty Memorandum.

"Upon inquiry as to the cost of such a battleship we were informed by the Admiralty that it is approximately £2,350,000, including armament and the first outfit of ordnance, stores, and ammunition. The total cost of three such battleships, which when launched would be the most powerful in the world, would be, approximately, $35,000,000, and we ask the people of Canada, through their Parliament, to grant that sum to His Majesty the King of Great Britain and Ireland and of the Oversea Dominions, in order to increase the effective naval forces of the Empire, to safeguard our shores and our sea-borne commerce, and to make secure the common heritage of all who owe allegiance to the King.

"Those ships will be at the disposal of His Majesty the King for the common defence of the Empire. They will be maintained and controlled as part of the Royal Navy, and we have the assurance that if at any time in the future it be the will of the Canadian people to establish a Canadian unit of the British Navy, these vessels can be called by the Canadian Government to form part of the Navy, in which case, of course, they will be maintained by Canada, and not by Great Britain. In that event, there will, necessarily, be reasonable notice, and, indeed, Canada would not desire or suggest the sudden withdrawal of so powerful a contingent from any important theatre in which the naval forces of the Empire might be exposed to severe and sudden attack. In the meantime, I am assured that special arrangements will be made to give Canadians an opportunity of serving as officers in these ships."

With reference to the suggestion that Canada should have a separate naval organization, Mr. Borden went on to state that, in comparison with that already existing in Britain, "In my humble opinion nothing of an effective character could be built up in this country within a quarter, or, perhaps, half a century. Even then it would be but a poor and weak substitute for that splendid organization which the Empire already possesses, and which has been evolved and built up by centuries of the most searching experience and the highest endeavour. Is there really any need that we should undertake the hazardous and costly experiment of building up a naval organization especially restricted to Canada when upon just and self-respecting terms we can take such part as we desire in naval defence through the existing naval organization of the Empire, and in that way can fully and effectively avail ourselves of the men and the resources at the command of Canada?"

Then as regards the ships themselves: "Where shall these ships be built? They will be built under Admiralty supervision in the United Kingdom for the reason that, at present, there are no adequate facilities for constructing them in Canada. The plant required for the construction of 'Dreadnought' battleships is enormous, and it would be impossible at present to have shipbuilding in this country on such a scale. In any case, only half could be built in Canada, because the machinery for armour and guns would, necessarily, be constructed or manufactured in the United Kingdom. The additional cost of construction in Canada would be about 12 million dollars for three, and it would be impossible to estimate the delay. No one is more eager than myself for the development of the ship-building industries in Canada, but we cannot, upon any business or economic considerations, begin with the construction of 'Dreadnoughts,' and especially we could not do so when these ships are urgently required within two or three years at the outside for rendering aid upon which may depend the Empire's future existence. According to

my conception, the effective development of the shipbuilding industries in Canada must commence with small beginnings and in a businesslike way. I have discussed the subject with the Admiralty, and they thoroughly realize that it is not to the Empire's advantage that all shipbuilding facilities should be concentrated in the United Kingdom. I am assured, therefore, that the Admiralty are prepared in the early future to give orders for the construction in Canada of small cruisers, oil tank vessels, and auxiliary craft of various kinds. The plant required is relatively small as compared with that which is necessary for 'Dreadnought' battleships, and such an undertaking will have a much more secure and permanent basis from the business standpoint. For the purpose of stimulating so important and necessary an industry we have expressed our willingness to bear a portion of the increased cost for a time at least. I see no reason why all the vessels required in future for our Government service should not be built in Canada, even at some additional cost."

In passing, Mr. Borden made reference to the fact that all states were now levying vast contributions for armaments; Argentina had spent between £13,000,000 and £14,000,000 within the past four years, and the United States £50,000,000 to £60,000,000. The Canadian nation, however, enjoyed the protection of the British Fleet, "without the cost of a dollar," and had done so for 45 years.

DEBATE ON THE BILL.—The debate on the Bill, on the amendment by Sir Wilfrid Laurier that Canada should build up two fleets of her own, the one on the Atlantic and the other on the Pacific coasts, covered a period of two months, and, on being put to the House on February 13th, was defeated by 122 to 75; the Government resolution was then put and carried by 115 to 83.

As already mentioned, the Bill passed the second reading on February 27th-28th; the introduction of party politics has rather obscured the main issue, the chief amendments calling for a plebiscite, and redistribution to be followed by an election before the Bill becomes law. The debates on both readings have been prolonged considerably beyond the Government's original intentions, attempts being made to discredit the Bill, by dragging out the discussion, and thus preventing its passing before the next general election.

JAPAN.

BUDGET.—The proposals for an increase of the Japanese Navy do not appear likely to be realized. Owing to the unfavourable financial situation of the Empire, the Government is bent on reducing expenditure in every possible way.

On the initiative of the new President of the Cabinet, there were created at the beginning of 1912, in all the administrative departments, commissions to examine into the possibility of effecting economies in the different administrative departments. So far as can be ascertained up to the present, a saving has been realized of about £3,125,000. This will serve to diminish the general taxes, and to meet (more particularly) extraordinary expenses.

Although in the other administrative departments it has been found possible to economize about 15 per cent., the saving in the administration of the Navy may only reach, at the outside, 10 per cent., or about four million yen, out of an ordinary expenditure of 40 million yen (£4,166,666).

Instead of the programme of construction comprising seven battleships and six armoured cruisers, of which two were to be laid down every year, the Japanese appear to have gone back to the carrying out of the so-called "little programme" of construction. This latter provided for an increase of expenditure of 90 million yen for the construction of three new "Dreadnoughts"; this expense to be spread over five years. The whole programme would come to the same actually by the construction of three battleships, which are yet to be voted, and the completion of the new constructions already building in the yards (one battleship, four armoured cruisers), except in giving the fleet a nucleus of four modern battleships and four armoured cruisers.

DISPOSITION OF THE FLEET.—The First Squadron carried out battle practice at Tokuyama in July; it then put into Nakatsu at the end of July, and proceeded thence to carry out manœuvres off the west coast of Kiushiu. It anchored from August 1st to 6th in the Bay of Tokio. Thence it rendezvoused at Yokosuka in Ise Bay, making a junction with five destroyer flotillas and carrying out exercises individually and by squadrons (exercises of the second period). These exercises were interrupted by the funeral ceremonies of the late Emperor, and the fleet remained from September 11th to 16th at Shinagawa. On September 17th, the squadron put out to sea again, joining in Ise Bay with the Second Squadron and the ships of the 1st Reserve of four reserve squadrons, to carry out the exercises of the third period of instruction, and to prepare then for the autumn manœuvres.

The Second Squadron was stationed, in July and August, in the Yellow Sea, and there carried out battle practice. In September it joined the First Squadron in Ise Bay for combined manœuvres.

RESERVE SQUADRON.—The ships of the 1st Reserve, "Kurama," "Ikoma," "Akashi," "Koshima," "Tsushima," "Satsuma," and "Tone," exhibited an unusual activity in the spring, probably in view of their participation in the autumn manœuvres.

SUBMARINES.—Submarines 1, 2, and 7 of the First Flotilla, which comprises the first seven units, are now in commission, as also are numbers 10, 11, and 12 of the Second Flotilla, which comprises submarines 8 to 13. The parent ships of the First Flotilla are the "Reckisan Maru" and the "Isusan Maru"; that of the Second Flotilla, the "Karasaki." Up to the beginning of August, the two flotillas carried out exercises in the Bay of Hiroshima, after which the units attached to the Second Flotilla returned to Yokosuka.

NEW CLASSIFICATION OF THE SHIPS OF THE JAPANESE NAVY.—At the commencement of September the new classification of the ships of war of the Japanese Navy was published. The classification is as follows:—

(1) Battleships (*sen kan*).
(2) Battle-cruisers (*jun yó sen kan*).
(3) First-Class Cruisers (*itto jun yó kan*), more than 7,000 tons.
(4) Second-Class Cruisers (*nitó jun yó kan*), less than 7,000 tons.
(5) First-Class Coast Defence Vessels (*itto kai bó kan*), more than 7,000 tons.
(6) Second-Class Coast Defence Vessels (*nitó kai bó kan*), less than 7,000 tons.
(7) First-Class Gunboats (*ittó hó kan*), more than 800 tons.

(8) Second-Class Gunboats (*nitó hó kan*), less than 800 tons.
(9) Destroyers (*ku ckiku kan*), first-class—more than 1,000 tons; second-class—1,000 to 600 tons; third-class—less than 600 tons.
(10) Torpedo-boats (*sui vai tei*), first-class—more than 120 tons; second-class—less than 120 tons.
(11) Submarines (*sen sui tei*).

Of all the former Russian ships, the "Hizen" ("Retvisan") alone is still regarded as a good battleship; all the others have been relegated to first-class coast defence vessels.

The administrative name, "battle-cruisers," for modern armoured cruisers, armed with big guns, is new, as is "first-class gunboats" for ships hitherto termed "Scouts," and comprising the "Chihaya," "Yodo" and "Mogami." The former merchant vessels "Toyohashi," "Karasaki," "Manshu," and "Matsue" are regarded as warships under the new classification and not as auxiliary vessels, and they are classed with the older cruisers amongst the second-class coast defence vessels.

The classification of the destroyers into three classes should be noted, the first two of which contain only two units at the present time.

PERSONNEL.—Hitherto, Naval Cadets have been entered in July and have completed three years' study at the Naval College; each of these years commenced August 1st and ended the following July 1st. At the end of the third year, they passed for midshipmen, and went afloat in July with the Training Squadron; hence they went on board ship for the first time after three years of service. Occasional short trips for instructional purposes on the old vessels attached to the Naval College could give the cadets only an imperfect idea of service afloat.

In accordance with the new regulations, Naval Cadets newly entered first of all proceed for a period of four months to the sailing training ships to receive there a general knowledge of the duties on warships. It is only after these four months that the course at the Naval College commences; this course lasts three years as before. As the entry in July has been continued, the embarkation afloat takes place on August 1st, and the course itself does not commence till joining the college on December 1st.

The course of three years at the School for Engineer Students has been equally prolonged by four months in accordance with the extension of the course. They undergo no training afloat during their three-years' course.

NEW CONSTRUCTION, DOCKYARDS, PORTS.—On October 4th, the gunboat "Sago," 785 tons, was launched, and on November 21st, the battle-cruiser "Hiyei," was under construction in the dockyard at Yokosuka.

The *Pall Mall Gazette* publishes some data on the employment of foreign matériel in the construction of the new Japanese warships. According to this paper, there is 61 per cent. non-Japanese matériel in the "Satsuma," 58 per cent. in the "Kurama," and 20 per cent. in the "Kawachi"; the proportion should be lower in the "Settsu."

The fortified port of Takeshiki, which was, up till now, a second-class fortified port, was reduced on October 1st, according to the official journal *Kampo*. The command of the port has been abolished, and the place will only be occupied by a defence detachment of 150 men. The workmen of the repairing shops at Takeshiki are, according to the papers, to be discharged from the end of August, and the greater part of the machinery has been removed to Chinkai. The 14th and 15th Torpedo Divisions

stationed formerly at Takeshiki were transferred in August to Sasebo. Chinkaï has not, at the moment of writing, been declared a second-class military port.

There are at the present time five first-class fortified ports: Yokosuka, Kure, Sasebo, Maizuru and Port Arthur; there are, in addition, two second-class fortified ports: Ominato and Bako, and three fortified ports with defence detachments: Takeshiki, Chinkaï and Fiko.

THE TYPHOON OF SEPTEMBER 22nd-23rd, 1912.—On September 22nd-23rd, a typhoon burst over Japan, and did considerable damage to the fleet assembled in Ise Bay. The destroyers and torpedo-boats, which were at anchor in the northern part of the bay, sustained the severest damages. On the approach of the cyclone, the ships were three miles from the shore; they anchored in the Strait and tried to maintain their position by keeping their engines going. But the sea was so great that the fires of the torpedo-boats "Tashibaua" and "Fubuki" were put out—they had only one boiler steaming—and these vessels were driven ashore two or three miles north of Yokkaichi, three sailors being severely injured on the "Fubuki." This vessel was refloated on October 11th, and the "Tashibaua" on October 9th. Eleven torpedo-boats and destroyers were dismasted, three men being killed and 11 injured. Torpedo-boat No. 71 stranded at Toba, but was refloated the next day. Amongst the large vessels, the "Satsuma" and "Manshu" each lost a mast (probably a yard). Torpedo-boat No. 47 dragged her anchor and went ashore at Sauvigabama, her damages were so severe that the work of salvage was abandoned, and the vessel has been removed from the list of the Navy.

(La Marine Française, from German sources).

MILITARY NOTES.

BRITISH EMPIRE.

The following are the principal appointments, and retirements for February:—

APPOINTMENTS.—Colonel (local and temporary Major-General) S. B. von Donop, to be a member of the Army Council, dated February 8th; Major-General Sir C. Fergusson, Bart., C.B., M.V.O., D.S.O., to command a division, vice Major-General W. P. Campbell, C.B., dated February 4th; Major-General Sir C. F. Hadden, K.C.B., to be President Ordnance Board, vice Admiral R. F. O. Foote, C.M.G., dated February 8th.

PROMOTIONS.—Colonel (Temporary Brig.-General) B. von Donop is granted local and temporary rank of Major-General while employed at the War Office, dated September 30th, 1912; Colonel G. Drummond, C.B., M.V.O., half-pay list, to be Major-General, vice Sir H. N. Bunbury, K.C.B., placed on retired pay, dated February 15th.

OFFICERS' RETIRED PAY.

The following announcement appeared in Army Orders for February, 1913 (A.O. 38/1913) dated January 29th, 1913:—

GEORGE R.I.

Whereas we deem it expedient to grant combatant officers of Our Army, who held the substantive rank of captain, lieutenant, or second-

lieutenant on the 30th August, 1911, the option of accepting either the conditions for the grant of retired pay in Our Warrant of 31st August, 1911, or the conditions previously in force;

Our Will and Pleasure is that combatant officers of Our Army who held the substantive rank of captain, lieutenant, or second-lieutenant on the 30th August, 1911, shall have the option of remaining under the regulations originally contained in the Warrant of His late Majesty for the Pay, Appointment, Promotion and Non-Effective Pay of Our Army, dated the 1st December, 1909, governing the retirement and retired pay of majors and lower ranks.

An officer who elects to remain under the regulations originally contained in the Warrant of His late Majesty for the Pay, Appointment, Promotion and Non-Effective Pay of Our Army, dated the 1st December, 1909, shall only be eligible for the rates of retired pay of majors and lower ranks laid down therein, and shall be subject to those regulations as regards retirement for age in the rank of captain, lieutenant, or second-lieutenant.

Army Council's Instructions.

Officers will be permitted to exercise the option of accepting the conditions of the Royal Warrant of 31st August, 1911, or of remaining under the regulations originally contained in the Pay Warrant of 1st December, 1909, at any time up to 30th September, 1913, and officers who do not make their election before that date will be held to come under the provisions of the Royal Warrant of 31st August, 1911.

Officers electing to come under the old regulations will receive an official acknowledgment of their application, and a list of all such officers will in due course be published in Army Orders. The inclusion or non-inclusion of an officer's name in this list will be regarded as the authority for determining in the future the regulations under which the officer will come for retirement and retired pay, and the choice, once made, will be final.

An officer who elects to remain under the old regulations will be subject to Articles 509 and 513 of the Pay Warrant of 1st December, 1909. He will be entitled to the following rates of retired pay:—

£120 a-year after 15 years' service (or 12 years in the West India Regiment).

£200 a-year after 25 years' service, if a major (three years' service in the substantive rank being required in cases of voluntary retirement).

If retired for age, provided that at the time of retirement he is counting service towards retirement:—

£200 a-year if a captain or subaltern.

£300 a-year if a substantive major.

He will be eligible for the new rates of retired pay for lieut.-colonel, but not for the scale of retired pay provided for majors and lower ranks by the Warrant of 31st August, 1911, and he will be retired at the age of 45 if he has not then reached the brevet or substantive rank of major.

An officer who comes under the provisions of the Royal Warrant of 31st August, 1911, will retain his rights to £120 a-year after 15 years' service (or 12 years in the West India Regiment), and to £200 a-year on retirement for age as a captain or subaltern if then counting service towards retirement. He will be eligible for retention beyond the age of 45 if a captain or subaltern, under the provisions of Article 509 of the Royal Warrant, as amended by Army Order 237 of 1911. After 20 years' service he will be eligible for the rates of retired pay laid down in Articles 509 and 513 of the Royal Warrant, as amended. If retired for age in the substantive rank of major, his retired pay will be determined by Article 513, as amended; that is, he will not be entitled to £300 a-year retired pay unless he has completed 28 years' service.

BELGIUM.

REMOUNT DEPÔT.—A remount depôt has been created in order (1) to acclimatize and break young horses before issuing them to mounted units; (2) to constitute, in time of mobilization, a reserve of saddle and draught horses, capable of replacing wastage.

The personnel is to consist of one lieut.-colonel as commandant, five other officers, and 309 non-commissioned officers and men.

Horses will be kept at the remount depôt for about six months, those bought in April being issued to regiments in September, those bought in September being issued in the following April.

CHINA.

Events in January.

RUSSIA AND CHINA.—The Russian Government notified China of the extension of the treaty of 1881 for a further period of ten years, but with the abolition of the 50 verst free zone on the Russo-Chinese frontier.

It was reported in the Press that the Russian Government was pressing China for payment of the Boxer indemnity.

MONGOLIA.—A Mongolian Mission, including the Minister for Foreign Affairs, arrived in St. Petersburg on January 10th, and has been received by the Tsar. It is reported that the mission is asking for Russia's armed assistance if China should interfere with Mongolia's independence.

According to the Press, a treaty has been concluded between Tibet and Mongolia, as independent States. It contains, amongst other things, a mutual recognition of each State by the other, and deals with the development of trade relations between them. It also contains provisions for the advancement and spread of Buddhism. The treaty appears, from Press reports, to have been negotiated at Urga, on behalf of Tibet, by the Buriat Djorjieff.

CHINESE TROOPS.—According to the Press, General Chung and his Chinese soldiers, who are leaving Tibet for China, *via* India, were expected to reach Yatung from Lhasa on January 9th.

FRANCE.

Events in January.

NEW WAR MINISTER.—M. Millerand resigned the office of War Minister in January, owing to the political crisis arising out of the reinstatement of Colonel Paty du Clam. M. Etienne, who succeeded him, is 69 years of age. He was, in his young days, a protégé of Gambetta, who made him Inspector-General of French Railways. He is undoubtedly an able man, and it is believed that he will carry on the policy of M. Millerand.

CONSEIL SUPÉRIEUR DE LA GUERRE.—The following officers compose the *Conseil Supérieur de la Guerre* for 1913:—

Generals Joffre, Chief of the General Staff; Gallieni, President of the Committee of Colonial Defence; Archinard; Michel, Gouverneur Militaire de Paris; Pau; Marion; Chomer; Menestrel; Meunier; Laffon de Ladebat, Vice-President of the *Commission Militaire supérieur des Chemins de fer*; Langle de Cary.

STAFFS IN WAR.—New regulations have been brought out for the organization of Staffs in time of war. The old regulations indicated a somewhat passive *rôle,* in which the principle duty was *liaison;* the new regulations contemplate a much more active assistance being given to the commander, and lay down definitely the duties of a staff officer detached as an *officier de liaison.* Another new feature is the insistance on all orders being in writing. In addition to the three bureaux into which the staff has heretofore been divided, a new fraction is created, called the *Section du Courrier,* whose duties consist of sending off and receiving and registering all messages, and allotting them to the bureau concerned.

The Commandant of the *Section du Courrier* fulfils the duties of Camp Commandant, and the officers of his section take it in turns to be officers of the day and piquet officers, so that the remainder of the staff is relieved of this duty.

The Commandant of the *Section du Courrier* chooses and establishes the *Poste de Commandement,* to which all reports and messages for the Commander are sent, and has complete control over all orderlies, motor cyclists, etc.

Detailed instructions are given as to how orders should be written, and a *cadre memento* (form of headings) for various reports are given. These instructions are very much like those given in our own regulations, but go into greater detail.

RESERVE OFFICERS.—Army corps commanders have been directed to furnish reports twice annually on all General Officers and colonels of the Reserve who live in their regions, whether these officers are designated for a command, or not, on mobilization. The reports are to state whether the officer is physically, mentally and morally fit to be employed after mobilization. Hitherto, the only reports on these officers have emanated from themselves, and it is thought that they are sometimes not entirely impartial.

RECRUITING FOR THE CAVALRY.—Exertions are to be made to secure a greater number of three-year volunteers for the cavalry. The two years' law has had lamentable results on this arm, and it has been pointed

out that in Greece alone of European countries the short-service cavalry are not kept for a longer period than the infantry. The Préfets have been ordered to draw attention to the advantages gained by those making voluntary engagements, *e.g.*, choice of army corps, certainty of incorporation in cavalry or horse artillery, special pay of one franc a day during the third year of service. It seems unlikely that the 13,000 volunteers required will be forthcoming, and if they are not it is difficult to see how a reversion to a longer period of service for the cavalry can be avoided.

EDUCATION OF RANK AND FILE.—The results of the examination on the general education of the new contingent have just been published, and show that 37 per cent. have educational certificates and diplomas, 33 per cent. are well enough educated, 16 per cent. are insufficiently educated, 9 per cent. are illiterate, and 5 per cent. were absent.

French Colonies.

ALGERIA.—News has been received that on November 14th last, at Tagenout, a French N.C.O. and 30 camel men attacked a raiding party coming from Tafilalet in the region of El Guettara el Achouran. After a four-hours' fight the raiders took to flight, leaving 13 rifles and 300 camels, some slaves and a lot of loot behind them. Hearing of the fight, Captain Charlet, the commander of the Tidikelt Saharan Company, immediately set out in pursuit with 50 men, and on November 29th came up with the enemy ten miles north of Zmila, and defeated them soundly, forcing them to abandon all their camels and a large quantity of modern rifles and 50 slaves.

Captain Charlet's detachment covered 625 miles in 30 days.

ITALY.

RETENTION OF THE 1890 CLASS.—The 1890 Class of the Army in Italy, due to leave the colours last December, was retained until the men of the same Class now serving in Libya should have been sent back to Italy and released from their service.

ARTILLERY.—The Italian Press give the following details for the Deport guns, which are replacing the 1901 75.A. gun in 93 batteries.

The Deport gun has an angle of elevation of 65°, and of depression of 15°, and it can be traversed through an arc of 50°. It is to be fitted with the new Deport "Scissors" trail; the new Deport guns should be issued by July, 1913. Twelve batteries of new model Krupp guns have also been ordered. One hundred batteries are armed with the Krupp gun, model 1906, making 193 batteries of field artillery in all, without including the batteries now forming. Each battery has six guns.

Both the Deport guns and the new Krupp guns take 1906 model ammunition.

Libya.

Events in January.

ADMINISTRATION.—Tripolitana and Cyrenaica were formed into two separate provinces, each under a governor who is responsible to the Minister for the Colonies. The governor of a province has under his command all the naval and military forces quartered in his province. Headquarters are at Tripoli and Benghasi respectively. General Ragni is the new governor for Tripolitana, and General Briccola for Cyrenaica.

DEPARTURE OF TURKISH TROOPS.—Nesciat Bey, with his staff, 75 officers, 650 soldiers, 60 civil officials, and some Turkish families, left Tripoli in the Sannio on January 14th.

RETURN OF ITALIAN TROOPS TO ITALY.—Large numbers of Italian troops returned to Italy during January. In most cases the reduction of the forces was carried out by one or more battalions of each regiment, and not by whole regiments.

GENERAL SITUATION.—Syrte, about 130 miles south-east of Misurata, was occupied, and 170 Turkish regulars were sent away from there. Five hundred rifles and 100 boxes of cartridges were handed in.

In Tripolitana the country as far as Gharian was quiet, and it appeared that the occupation of Syrte might prevent the contraband in arms and ammunition which was reported to be still going on.

In Cyrenaica groups of unarmed Arabs continued to return to the coast towns, but the situation otherwise was unchanged. It was pointed out in the Italian Press that the Turks themselves never administered the country properly, and that the garrisons of Derna and Benghasi merely went into the interior occasionally to levy tribute from the warlike tribes of the interior; and that the policy to be adopted in Cyrenaica should, therefore, be one of peaceful penetration, without precluding the use of more violent measures when necessary.

COMMUNICATIONS.—Camel mails were established between Ferua, Agilah, Zavia, Zanzur, and Tripoli.

It was said that agreements were in progress for the Egyptian railway to be extended *via* Sollum to Cyrenaica.

LOCAL LEVIES.—A battalion of Arabs was being raised at Homs; its strength was 1,000, and it was divided into ten companies. It was said that detachments from the battalion would be sent to occupy places in the interior under Italian officers.

TURKISH FORCES IN LIBYA.—According to records found in Tripoli, the Turkish garrison before the war was 3,500 strong, of whom 1,700 were in Tripoli, and the remainder distributed in other places.

SPOILS OF THE WAR.—The official journal publishes a decree showing the distribution of war spoils during the recent campaign. The total value is estimated at two and a half millions sterling, of which about £350,000 is in cash. The money is divided: 1/5th to the Invalid Pensioners Fund, 2/5ths to the troops and seamen engaged, and 2/5ths to the National Treasury.

JAPAN.

Events in January.

KOREAN GARRISON.—Prince Katsura, the new Premier, at the Council of the Governors of Provinces, announced the policy of his Cabinet. It was stated that the military programme, involving the creation of two new army divisions in Korea, was to be dropped, at least for the present.

PURCHASE OF STALLIONS.—The *Nippon* of 6th December, 1912, states that 41 thoroughbred stallions, bought in Australia, by the Horse Administration Bureau, arrived in Tokyo on the 2nd instant. For the most valuable horse of the batch the sum of £2,450 was paid.

CONFERENCES.—The following Conferences are announced to take place during February, March and April, 1913.

At the War Office. 1. Officers commanding regimental recruiting districts; duration, four days.
2. Principal medical officers of divisions; ten days.
3. Principal veterinary officers of divisions; six days.
4. Divisional commanders; ten days.
5. Principal intendance officers of divisions; ten days.
6. Chief of Staff of divisions; seven days.

At the General Staff. Chiefs of staff of fortresses; four days.

DRAFTS FOR GARRISON IN MANCHURIA.—An alteration has been introduced in the procedure of drafting recruits to Manchuria whereby, from this year inclusive, they are to be sent to their respective regiments direct, and undergo their first period of training with them instead of on the completion of it at home.

RUSSIA.

APPOINTMENTS.—Lieut.-General Shcherbachęv, Commandant of the Imperial Nikolas Academy (Staff College) has been appointed General Officer Commanding IXth Army Corps (Kiev). He is 56 years of age and has no war service.

General Sakharov has been appointed General Officer Commanding XIth Army Corps (Kiev). He served as Chief of Staff to General Kuropatkin in the Russo-Japanese War, and also saw war service in 1877-78, 1900-1901, and is now 60 years of age.

ARTILLERY SIGNALLING.—The Artillery Committee has reported that the system of abbreviated Morse signals for artillery use, introduced in 1909, has proved unsatisfactory, and it is probable that a semaphore system will replace it.

THE COSSACKS OF THE DON.—An Imperial Rescript was addressed to the Don Cossacks on the occasion of the Centenary of 1812, confirming to them their historic conditions of service.

FORTIFICATION.—A Bill promulgated on November 1st, 1912, declares the towns of Reval and Grodno to be *points d'appui* for the Navy and Army, and imposes restrictions to prevent foreign subjects from holding real estate in those places. Foreigners are also prohibited temporarily from residing in the island of Nargen, about ten miles north-west of Reval.

FRONTIER GUARD.—It was reported in the Press that two new brigades of frontier guards will be formed for Central Asia and Trans Caucasia, and also two additional coastguard detachments.

UNIFORM.—Army Order 669/1912, introduces the fur cap, worn by Siberian troops, for units of the XXIInd Army Corps, quartered in Finland and Northern Russia.

RUSSIAN MILITARY PREPARATIONS.—*Die Post* (Berlin, February 14th, 1913), publishes an article under the above heading, purporting to emanate from well-informed Austrian military circles. The following are the chief points:—

"The Russian peace establishments, always high, have been exceeded," says the *Post*, "by more than 500,000 men, so that along the Prussian,

Austrian and Rumanian frontier more than three-quarters of a million Russian field troops were, at the time of writing, in a state of readiness. The units recruited in Poland had been removed to the Volga district, and even to the Mongolian border, and replaced by purely Russian regiments, which had been previously mobilized in the interior. Russia has thus doubled her strength in Poland and Volhynia without greatly increasing the number of units.

"Russian preparations," continues the article, "are not confined to increases of personnel; even greater attention has been paid to matériel. The fortresses in Poland and Volhynia were armed with all possible speed. The chief *place d'armes,* Warsaw, has been completely secured; the eastern front, hitherto insecure, has, by the addition of a number of modern works, been connected with Zegrj; the western belt of forts has been joined up with Novo Georgievsk, thus creating a closed triangle which, with a garrison of 100,000 men and 2,500 guns, is well able to afford a safe refuge to a defeated Russian Army, and would constitute a serious obstacle to a pursuing enemy.

"On the German frontier, the entrenched camps of Grodno and Kovno have been equipped, and numerous *têtes du pont* have been formed, and river dams and inundations arranged for. The strong fortress of Brest-Litovski will be the *point d'appui* of a central position and zone of concentration and assembly. At Kovel, the most important railway junction, an entrenched camp has been made, and the temporary works at Lutsk and Kovno have been strengthened and stored with large quantities of supplies. On both sides of the strong fortress at Dubno, entrenchments have been prepared which can be armed from the reserve artillery of the fortress. The unfortified towns, Kremenets and Ostrog, are also said to have been put in a state of defence.

"On the Rumanian frontier, along the River Dnyester, near the old fortress of Bender and near Rashkow, *têtes du pont* have been formed, in case of a Russian advance; between these points, near Dubosarri, batteries have been built to dispute the passage of the river."

The article goes on to state that "the improvement and security of the railways and roads have received the greatest attention. The positions at Rojishche, north of Lutsk, near Sarni Jmerinka and Dorogusk, all of which protect the railway, have been strengthened, and supply depôts have been formed. Opposite Krakov, quite near the frontier, gun emplacements are in process of construction. Preparations are being made to turn the important railway junction of Kiev into an up-to-date *place d'armes,* with a widely-extended belt of forts. The railway authorities have been instructed to keep large parks of rolling stock in readiness; the more important stations are already under military control. The frontier guards have been reinforced by regular troops. All fortified places," says the article, "have six months' supplies, Brest-Litovski has more. Large contracts have been concluded for forage and victuals and boots. Three hundred motor transport vehicles, ordered in Germany, were due for delivery on March 1st. The ammunition factories were working nightshift. The aviation and searchlight detachments were being perfected in detail, and extensive orders had been placed, notably in France."

UNITED STATES.

DEFENCES OF THE PANAMA CANAL.—The Secretary of the Navy informed the Naval Committee of the House of Representatives that Cuba has

granted the United States the right to purchase the hills overlooking the Guantanamo naval station, and that plans were on foot for strengthening the fortifications at this port with a view to protecting the north-eastern approaches to the Canal. According to the Press, the treaty providing for this enlargement was signed at Havana on December 27th, 1912, and by its terms the United States give up Bahia Honda in exchange for the new territory, and pay Cuba an increased amount for the use of Guantanamo Bay. One of the chief advantages of the extra territory is the acquisition of a good water supply.

Colonel Goethals, Chief Engineer of the Canal, has been appointed to the post of Civil Governor of the Canal Zone.

It was officially announced that the Canal was expected to be ready for the admission of water on July 1st next, and that on September 25th next the first vessel will be sent through. The latter date is the 400th anniversary of the discovery of the Pacific Ocean by Vasco Nuñez de Balboa. From September 25th until its formal opening, the Canal will be utilized for the purpose of training the Canal Staff.

PROPOSED CHANGES IN ORGANIZATION.—The United States General Staff has formed a new organization upon which their military forces are to be based. It is very similar to the divisional organization adopted in recent years for the British Regular Army and Territorial Force, and collects the Militia of the various States into brigades and divisions grouped territorially. Under the proposed plan the Regulars and Militia will be organized into 16 tactical divisions, the first four of which will be composed of regular troops.

The details of the scheme have been sent to the Governor of every State for his observations.

CHANGES IN CAVALRY EQUIPMENT.—The following descriptions of the new equipment recommended for the United States Cavalry have been taken from the *Journal of the United States Cavalry Association* :—

The Bridle is of the combination halter-bridle type. It weighs five pounds. The headstall permits ready adjustment to secure a good fit for heads of different sizes.

The Rifle Carrier.—When the trooper is mounted, the butt of his rifle rests in a boot on the near side, being held steady by a leather-lined ring projecting from the back of the trooper's belt, through which the muzzle passes, and by a strap passing downward from the belt to engage with the trigger guard. The rifle thus remains with the trooper, and offers no obstacle to quick mounting and dismounting.

Entrenching Tools.—An individual entrenching tool is recommended. The picket-pin has a hammer head, and there are shovel, pick and hatchet heads, into which the picket-pin fits as handle. The proposed distribution is one hatchet to each duty sergeant, and three shovels to one pick, approximately, throughout the remainder of the troop. To counteract the weight of the tool, it is recommended that one spare horse shoe be carried instead of two, as at present.

A new *Feed Bag* is recommended. This is a canvas cylinder open at one end, but arranged on the horse with its long axis nearly horizontal. It permits the horse's nostrils to have free access to the air, and spreads the grain over a greater area in the bag. Eight to ten pounds of oats can be carried in this bag in the form of a roll on the pommel, but for

greater convenience an insert sack has been made. This is generally carried in the feed bag, but can be filled and carried independently, thus doubling the supply of forage which may be carried.

The weight carried by the horse with the proposed equipment (including the weight of the trooper, calculated as 150 lbs. stripped) is 262 lbs. 3 ozs.

The dismounted equipment (including the clothing) weighs 56 lbs. 9 ozs. This includes ration bags, canteen, entrenching tool, blanket roll and bandolier. On going into action, this weight would be reduced to 46 lbs. 2 ozs., the balance of weight being placed in regimental transport.

ANNUAL REPORT OF THE SECRETARY OF WAR.—In his Annual Report for 1912 the Secretary of War reviews the work of the past year and the changes which have taken place. The chief points to which he draws attention are:—

(*a*) The decrease of typhoid fever, and necessity for further steps to combat venereal disease.
(*b*) The creation of a reserve by introducing a seven year term of service, of which four is with the colours.
(*c*) The necessity for garrisoning adequately the Canal Zone, Hawaii and the Philippines.
(*d*) The operations on the Mexican border.
(*e*) The proposed organization of the Army on a tactical basis.
(*f*) The simplifications introduced in correspondence.
(*g*) The formation of the Quartermaster's Corps.
(*h*) The suggestion that the National Guard should receive more training and should be paid for it, and thereby be capable of taking their place as second line troops available for general service.
(*i*) The advantages of the new detached service rule.

He gives a table which shows the effect in recent years of inoculation against typhoid fever, and states that in 1909 only a few volunteers were treated:—

In 1909 there were 173 cases and 16 deaths.
In 1910 there were 142 cases and 10 deaths.
In 1911 there were 44 cases and 6 deaths.
In 1912 (8 months) there were 9 cases and 1 death.

In the total of 368 cases and 33 deaths, only 18 cases and no death occurred in immunized individuals.

He recommends that canteens in barracks should be made more popular so as to keep men from going outside to undesirable houses in the towns.

Mexican Border.—There were in January, on duty in connection with the patrol of the Mexican border, six regiments of cavalry, one and a half regiments of infantry, one battery of field artillery, two companies coast artillery and one company signal service troops—a total of 6,754 officers and men.

Foreign Garrisons.—The troops required for foreign garrisons are:—
Panama Canal—6,500, besides coast artillery.
Pearl Harbour—14,000, besides coast artillery.
Philippine Islands—12,000 exclusive of native troops.

An urgent recommendation is made for pushing forward the erection of quarters in the Panama Zone, and at Pearl Harbour.

INTERNATIONAL MILITARY RIDING CONTEST.—This military competition took place in New York City from November 16th-23rd inclusive. The English competitors were Colonel P. A. Kenna, Captain M. Crawshay and Lieutenant R. M. Stewart Richardson.

These officers were successful in winning seven prizes, which included :—

(1) A tie for first place in the chief event for teams of three, and a defeat in the run off by only one point. Five nations competed.

(2) Captain Crawshay was first in the next most important event, *i.e.*, international jumping contest for individual officer's horses.

(3) Colonel Kenna was second in the international contest for chargers, which included a riding school test.

GUN EXPLOSION AT SANDY HOOK.—On December 9th, a 14-inch gun burst during its trials at Sandy Hook. It was one of the type being made for use in the Panama Zone, and was of a disappearing type.

The explosion is stated to have been due to a defective casting, and the rear mechanism was completely shattered. The use of wire to strengthen the breech is now being strongly recommended.

NAVAL AND MILITARY CALENDAR.

FEBRUARY, 1913.

3rd	(Mon.)	Expiration of armistice ; hostilities resumed in Thrace.
5th	(Wed.)	Inspection of H.M.S. "New Zealand" by H.M. The King, at Portsmouth.
"	"	Centenary of rising of East Prussia against Napoleon celebrated at Königsberg.
8th	(Sat.)	Attempted landing of part of Turkish Xth Corps at Sharkeui.
9th	(Sun.)	Attack in force on Scutari; casualties of Allies about 6,000.
"	"	Revolt of Mexican Federal Army in Mexico City.
"	"	Turkish warship "Assar-i-Tewfik" lost on rocks near Karaburun.
10th	(Mon.)	"Terra Nova," Scott Antarctic Expedition, reached Christchurch, N.Z., with news of Polar party.
14th	(Fri.)	Greek Flag hoisted over island of Crete.
"	"	Turkish cruiser "Hamidieh" arrived at Malta.
19th	(Wed.)	H.M.S. "Agamemnon" recommissioned at Sheerness.
21st	(Fri.)	Launch of H.M.S. "Paragon" from Woolston Yard (Messrs. John I. Thornycroft & Co.)
23rd	(Sun.)	Ex-President Madero shot in Mexico City.
28th	(Fri.)	Canadian Naval Aid Bill passed second reading.
"	"	H.M.S. "New Zealand" arrived at Cape Town.

AERONAUTICAL NOTES.

BRITISH EMPIRE.

ROYAL FLYING CORPS: *Flying Badge.*—Army Order No. 40 of 1913 announces that His Majesty the King has been pleased to approve of a flying badge to be made of gilt metal, fastening with a brooch pin for full dress, and to be of embroidery on blue cloth for service dress. It will be worn on the left breast above any medals or decorations by:—

a. All military officers of the Royal Flying Corps as long as they remain efficient aeroplane pilots, or, in the case of airship pilots provided they have once qualified as aeroplane pilots and remain efficient as airship pilots.

b. All non-commissioned officers and men of the Military Wing, Royal Flying Corps, or of the military establishment of the Central Flying School as long as they remain efficient as first or second-class aeroplane pilots.

AERONAUTICAL PROGRESS.—The War Office announced that an important phase in the development of the aerial land forces was reached with the departure on February 13th of a detachment of army aeroplanes from Farnborough, *en route* for Montrose, the new station of the Royal Flying Corps, in Forfarshire.

According to the system evolved for the establishment of bases at various centres in the United Kingdom, pilots of both the naval and military services are now being trained at the new Central Flying School at Upavon. As regards the military pilots, when their flying course is completed, the graduates pass on to one of the squadrons of the Military Wing, the headquarters of which are at Farnborough, and their technical education is completed during service with these units, where they become skilled in flying fast machines, and in the application of their craft to military purposes. In the normal course each new unit, which is termed a squadron, will be first formed, and receive its initial training, at Farnborough, after which, it will, in due course, be transferred to one of the new stations selected.

The present move to Scotland was carried out under this system, Montrose being the first station to be formed away from headquarters, with the exception of Lark Hill, where a detachment of the Royal Flying Corps has been stationed ever since the Corps was constituted in May last. The Squadron selected to carry out this first move is one of the first two of the aeroplane squadrons originally formed. It is designated No. 2 Squadron, Royal Flying Corps, No. 1 Squadron being an airship squadron, and No. 3 being the one at Lark Hill.

Notwithstanding the changeable weather, it was hoped by arranging for various halting places *en route,* to ensure the successful completion of the journey, and to gain the valuable cross-country experience which would be afforded in accomplishing the transfer of the machines to their new station by the mode of travel for which these are designed. The difficulties which had to be overcome were not, however, confined to prevailing winds; the convenient landing grounds at many points where halts would otherwise be possible, as, for example, at Oxford or Huntingdon, were partly under water, owing to the recent rains, and this fact constituted a further obstacle to the easy accomplishment of the journey.

It was a journey to be attempted by first-class pilots only, since the variations of weather conditions to be expected in so long a journey at this time of year made it difficult to accomplish, except in numerous stages. All the pilots were, however, well qualified for their task, and in this connection it is interesting to recall that one of their number, Captain Becke, who arranged the details of the journey for Major Sykes, the officer commanding the Military Wing, had recently accomplished a fine non-stop flight of 160 miles, with a brother officer as passenger.

The following officers of the squadron were to pilot the machines :—

Captain J. H. W. Becke, Captain G. W. P. Dawes, Lieutenant F. F. Waldron, Captain C. A. H. Longcroft, Lieutenant P. W. L. Herbert, and, in addition, the following officer was to perform the journey to assist the arrangements on the ground :—Lieutenant H. P. Atkinson, R.A.

The machines were to consist of :—Three Maurice Farman's, Nos. 207, 215 and 266; two B.E.'s, Nos. 216 and 217.

It was intended that, if possible, the machines should fly more or less in company, all performing the same stage of the journey on the same day.

SUMMARIES OF WORK DONE RECENTLY BY THE MILITARY WING OF THE ROYAL FLYING CORPS. PUBLISHED BY THE WAR OFFICE.

Week ending February 16th.

No. 1 (AIRSHIP) SQUADRON.—"Beta" and "Gamma" being overhauled by the Royal Aircraft Factory. "Delta" now at the Aero Exhibition at Olympia. Three free balloon runs were made by officers and men of the squadron during the week.

No. 2 SQUADRON.—The squadron has been waiting for suitable weather before starting on the flight to its new station at Montrose. Practically all the personnel had taken up their new quarters during last week, and only the road party to accompany the machines, and the pilots themselves, remained. On Monday a trial trip was made towards Uxbridge, by Captain Darbyshire, on a 60 h.p. "B.E." type machine (No. 201). Owing to the fog the pilot lost his way, and eventually descended in Regent's Park, slightly damaging the machine. The fog was too thick to start on Tuesday and Wednesday, but Lieutenant Waldron was able to return from Hounslow, where he had been detained. On Thursday a start was made by Captains Becke, Longcroft and Dawes, and Lieutenants Herbert and Waldron, piloting two 70 h.p. "B.E." type machines, and three 70 h.p. Maurice Farmans, respectively.

It was intended to reach Towcester, but owing to the fog, Captain Becke decided to land near Reading, Captain Dawes and Lieutenant Herbert doing the same. The other two officers returned to Farnborough, having got as far as Oxford, but getting into fog at this point. On Monday, February 17th, the journey was continued, both from Reading and Farnborough. Captain Longcroft and Lieutenant Waldron left Farnborough at mid-day against a steady north-east wind. Captain Longcroft descended near Oxford and damaged his propeller. Captain Becke reached Towcester about noon, and Lieutenant Waldron joined Captain Longcroft at Oxford. The remaining two pilots landed at Aylesbury.

No. 3 SQUADRON (LARK HILL).—On Monday, February 10th, Major Brook-Popham flew to Farnborough on a 70 h.p. "B.E." type of machine,

at a height of about 5,000 feet. Fog hindered flying considerably all through the week, but on the 10th and 12th a number of flights were made by officers and non-commissioned officers of the squadron, on the 70 h.p. Gnome-engined "B.E." type and Maurice Farman machines. On the 13th and 14th, owing to bad weather, only short test flights were possible.

No. 4 SQUADRON.—During the week eight officers attached to the squadron received a considerable amount of tuition on the 70 h.p. Renault-engined Breguet, and on the "B.E." types of machine. In all, 39 flights were made by officers of the squadron during the week.

GENERAL NEWS.—The "Delta," "B.E. 2," and one Cody biplane were on the War Office stand at the Aero Exhibition at Olympia. A party of two sergeants and five air mechanics were in charge.

On Saturday (15th), the Royal Aero Club entertained a party of 70 warrant officers, non-commissioned officers and men of the Military Wing to a luncheon at Olympia.

Week ending February 23rd.

No. 1 SQUADRON (FARNBOROUGH).—Owing to "Delta" being at the Aero Exhibition, and to "Gamma" and "Beta" being in the Royal Aircraft Factory for inspection and overhaul, no airship ascents have been made this week. Free balloon ascents have been made, and technical instruction in airship, balloon and kite work has been given daily.

No. 2 SQUADRON (MONTROSE).—The squadron, with the exception of the officers and men who are moving north by air and road, is now at Montrose, making every preparation to receive the machines after their long flight. By Wednesday, the 19th, all five machines had assembled at Towcester. On Thursday, the 20th, Captains Becke and Longcroft, on 70 h.p. Renault B.E.'s, and Lieutenant Herbert on a 70 h.p. Renault Maurice Farman, flew to Newark. In the evening they were joined by Lieutenant Waldron on another Maurice Farman. Captain Dawes spent the day in effecting repairs to his machine (Maurice Farman), which he had damaged slightly in landing at Towcester. On Friday, the 21st, Captain Longcroft and Lieutenants Herbert and Waldron pushed on to York. Captain Becke remained at Newark, waiting for Captain Dawes to join him. In the afternoon Captain Becke started for York, but was forced to land on the way, having trouble with his engine. This he put right during the night, and was ready again the next morning. On Saturday, the 22nd, Captain Longcroft and Lieutenants Herbert and Waldron proceeded from York to Newcastle—the next stage; Captain Becke flew on to York, and Captain Dawes, having repaired his machine, was able to get as far as Weston, some 20 miles south of York. No flights are made by machines of the Military Wing, Royal Flying Corps, on Sunday.

No. 3 SQUADRON (SALISBURY PLAIN).—During the early part of the week a strong north-east wind blew continuously on the Plain, and only a few flights were made. On Friday and Saturday most of the Officers and non-commissioned officer pilots were up on B.E. type and Maurice Farman machines.

No. 4 SQUADRON (FARNBOROUGH).—During the week Major Raleigh put in some flying on the 100 h.p. Gnome Breguet, and the other officers on Maurice Farmans. The week was chiefly occupied in the technical and theoretical instruction of the class of nine officers who are undergoing

a course of instruction with No. 4 Squadron. These officers will be examined at the Central Flying School next week.

Week ending March 1st.

No. 1 AIRSHIP SQUADRON.—The "Beta" engines having been thoroughly overhauled, on Wednesday a test of one hour and speed trials were performed, the latter giving very satisfactory results. On Thursday a flight to Salisbury and back, via Andover, was made, lasting in all four hours, the journey being performed without incident or hitch of any kind. Friday was also occupied in another series of speed trials.

The spare envelope of "Beta" is on loan to the Naval Wing detachment, which is attached to the Military Wing for instruction in airship work. The envelope is attached to the car of the Admiralty Willows airship, but met with a slight accident at Ash on Thursday, when piloted by Lieutenant Woodcock, R.N.

"Delta" has returned from the Show at Olympia, and will shortly be available for training purposes.

Besides airship work, a good deal of kite-work has been got through during the week, and a number of free balloon runs made.

No. 2 SQUADRON.—The main event of the week has been the successful termination of the flight to Montrose. The evening of the 25th saw four machines assembled at Edinburgh, while the fifth, Lieutenant Waldron's Maurice Farman, was at Berwick. On the 26th all the machines reached Montrose, Captain Becke on No. 217 (B.E. type) accomplished the journey in 45 minutes. Lieutenant Waldron made a non-stop flight from Berwick to Montrose. On the 27th and 28th all the officers of the squadron were out on their machines, exploring the country round Montrose.

No. 3 SQUADRON.—Monday and Tuesday were occupied in short test flights on the B.E. type machines. On Wednesday a party of non-commissioned officers and men of the squadron, under an officer, paid a visit to the Woolwich Arsenal. On Thursday, Maurice Farman machines Nos. 214 and 216 were flying well in a wind of 25-30 miles per hour. Friday was a good flying day, with a light wind, and a lot of work was got through by five officers of the squadron.

No. 4 SQUADRON.—The new Cody machine is now ready for use, and after a final test by Mr. Cody, was taken out for rolling practice on Friday by the officer who is learning to fly it. The other machine is now back from Olympia, and may shortly be expected to be in flying trim. Both the Breguet and B.E. machines were out on Monday, Wednesday, Thursday and Friday, but on the latter day No. 206 was found to be suffering from a heated front bearing, which necessitated taking down the engine.

Aeronautics in the Balkan War.

From Flight, of January 25th, 1913.

Flight has received from Messrs. Farman Frères the following interesting account of flights and reconnaissances, which was sent them by an aviator serving in the Greek Army in the Balkan theatre of war. The account covers a period of 20 days.

It has often been said that aviation, in the Balkan War, has not given all the results that were expected of it. And this is in some manner true, for the Balkan States had made little preparation. They had no

spare parts, few experienced pilots, and no organization. However that may be true for the general run of aeroplanes out there, it is far from being the case with their Farman machines, which, in spite of what has been said above regarding the lack of preparation of the Balkan States, have rendered the greatest service.

Even quite inexperienced pilots have been able to use them, and to report to their Commander-in-Chief observations of value. Their construction is such that in spite of the extremely rough ground where they had to operate, flights and landings were able to be made with very little breakage. We are of opinion that perhaps the best way to convey an idea of the services these machines have rendered to the Greek Government, is to relate the day-to-day flights made by Henry and Maurice Farman biplanes. This simple diary will be more eloquent than the more or less highly-coloured accounts that have been sent from the scene of hostilities.

This short diary simply concerns the period from December 10th to January 1st.

IN MACEDONIA.—There were seven Henry Farman biplanes in Macedonia—six with 50-h.p. Gnome motors and one fitted with an 80. Three of them remained unused for there were no pilots to fly them. The principal flights during this campaign were:—

Lieutenant Camberos, on the 80-h.p. Gnome-Henry Farman, made a reconnaissance from Larissa to Cosani, about 85 kilometres, at a height of 1,600 metres, reporting information of the greatest value.

Lieutenants Moutoussis and Notaras together made a scouting flight of more than 140 kilometres, on a 50-h.p. Gnome-Henry Farman biplane, at an altitude of between 1,100 and 1,200 metres, flying above opposing troops whose position they were able to reveal. In making short scouting flights two 50-h.p. Gnome biplanes were slightly damaged by landing on very bad ground, but repairs were effected easily.

Lieutenant Moutoussis, on a 70-h.p. Maurice Farman biplane, flew above Salonica at a height of between 1,200 and 1,500 metres. That machine was ordered to be dismantled and sent to Epirus.

IN EPIRUS.—The central aviation camp in Epirus was on the Plain of Nicopolis, six kilometres from Preveza. The chief of the flying squad was Captain Bares, a French military pilot, having under him two Greek Lieutenant pilots, Camberos and Notaras, who went through their tuition in France at the Farman school. On December 10th, Captain Bares and Lieutenant Camberos tested the Farman biplane that had been assembled and made flights above Preveza. The following day, the 11th, Notaras flew over Preveza, and in the afternoon Camberos left with a passenger for Philippias, 47 kilometres from Preveza, and afforded interesting observations. On the 14th, Camberos was transferred to the artillery, and on the following day Lieutenant Moutoussis arrived. Two days later he tested the Maurice Farman biplane that had been erected in the meantime, and flew over Preveza. The next day, at 1 p.m., Moutoussis left to make a flight above Janina, and landed at Amin Aga Han, 75 kilometres from Preveza. The distance between Preveza and Janina was 106 kilometres. During this flight, flying at over 1,600 metres, he threw down bombs, creating a veritable panic amongst the Turkish troops. Many hostile bullets tore the fabric, but the machine continued its flight unaffected.

Captain Bares, on the return of Lieutenant Moutoussis, used the same machine, and flew back over Janina, 2,300 metres up. Again several bullets pierced the fabric, but the machine returned to camp unaffected, except for a slight break that happened in landing on rough ground. That same day a new Maurice Farman biplane arrived, and erection was immediately proceeded with. On the 20th, Moutoussis flew over Preveza on the Maurice Farman, and made interesting reports. He continued his flights the next day. He made a second reconnaissance over Janina on a Maurice Farman on the 22nd inst., flying over the town at 2,100 metres, and throwing bombs, which, as on the previous occasion, had considerable effect. Several hostile bullets reached him, breaking a longeron, but without affecting the machine's flying qualities. He landed at Philippias. Next day he left that town for Nicopolis. On the 24th, Notaras made flights with a passenger above Preveza. Between then and the 27th, when a new machine arrived and was erected, the two lieutenants continued their scouting flights on their respective Farman biplanes. A Greek Army pilot officer, Adamides, joined the corps on the 28th. A very excellent reconnaissance flight was made by Lieutenant Notaras above the fort of Bisani and the town of Janina on New Year's Day. He flew at about 2,300 metres. Leaving the aerodrome at Nicopolis at 10.20 a.m., he returned at 12.18, reporting observations concerning the garrison and the fortifications, which were considered of the highest importance by the Greek commanding officer.

During this campaign of 20 days, only three machines suffered damage, and what damage was done was easily repaired.

FOREIGN PERIODICALS.

NAVAL.

AUSTRIA-HUNGARY.

MITTEILUNGEN AUS DEM GEBIETE DES SEEWESENS. Pola: **No. 2, February, 1913.**—The Red Cross Convention in naval war. The Imperial Naval Budget for 1913. The French Naval Manœuvres, 1912. The Laurenti submarine dock.

FRANCE.

LE YACHT. Paris: **February 1st.**—The Battle Fleet in 1912.* **February 8th.**—The Battle Fleet in 1912.§ The Brazilian Battleship, "Rio de Janeiro." Brest Roadstead. **February 15th.**—Sub-division of our battleships into squadrons. **February 22nd.**—The Navy Estimates in the Chamber. The British destroyer "Shark."

LA MARINE FRANCAISE. Paris: **January.**—Speeding up the construction of battleships. Should we change our powders?§ Review of foreign navies.

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LA VIE MARITIME. Paris: **February 10th.**—The new Minister of Marine. Comparative trials of certain American destroyers. **February 25th.**—The Navy's powders. Naval education.

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GERMANY.

MARINE RUNDSCHAU. Berlin: **February, 1913.**—The study of naval history. The history of the Bosphorus question. Moltke. The Balkan War.

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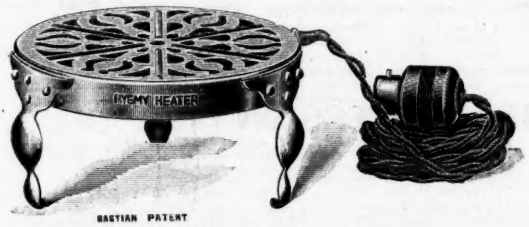

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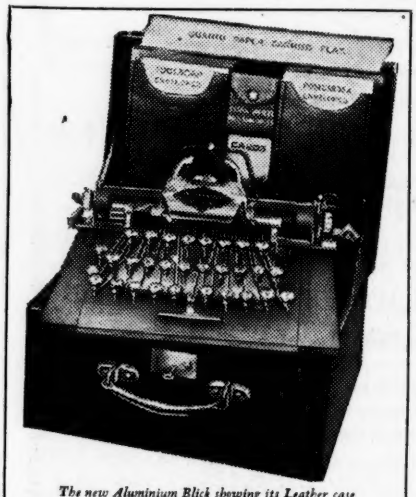

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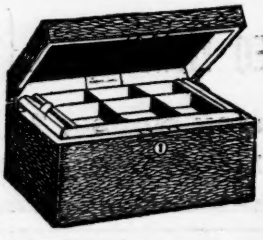

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